

NUCLEAR REGULATORY COMMISSION STAFF'S
ENVIRONMENTAL IMPACT APPRAISAL
OF
CONTINGENCY STORAGE OF
LOW-LEVEL RADIOACTIVE WASTE
AT
PENNSYLVANIA POWER AND LIGHT COMPANY
SUSQUEHANNA STEAM ELECTRIC STATION
DOCKET NO. 30-19311

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1.0 PURPOSE OF REPORT AND NEED FOR THE PROPOSED ACTION

1.1 The Environmental Assessment

This report has been prepared in accordance with the general requirements of Title 10, Code of Federal Regulations, Part 30 (10 CFR 30) for the purpose of evaluating the environmental effects of the Pennsylvania Power and Light Company's and Allegheny Electric Cooperative, Incorporated's (hereinafter jointly referred to as PP&L) proposal to store low-level radioactive waste (LLRW) onsite at its Susquehanna Steam Electric Station (SSES) for a period of five years. Additionally, it is to provide a basis for the Nuclear Regulatory Commission (NRC) staff's decision to prepare an environmental impact statement (EIS) or to issue a negative declaration.

The scope of the assessment considers three logically separable periods of time. The first period involves the activities performed during the five-year term of a license. The second period addresses the options available at the end of the five-year period. The third period encompasses those activities at the end of the life of the facility (i.e., activities generally considered as decommissioning).

The above scope of review was selected by the NRC staff based, in part, upon the following observations:

1. The ongoing operation of the SSES will result in the continued generation of waste and the LLRW Holding Facility (LLRWHF) has a useful life well beyond the five-year term of the initial license; thus, the provision for storage of LLRW onsite after the initial term of the license should be considered in assessing total foreseeable impact associated with the LLRWHF.
2. The capacity of the facility will accommodate a maximum of eight reactor years production of waste and thus the removal of the waste after the initial license term or storage of the waste for the life of the plant should also be part of the total assessment of the foreseeable impacts associated with the proposed action.

3. Decommissioning of the LLRWHF at the end of its useful life will be necessary.

For the reasons discussed in this Environmental Impact Appraisal (EIA), the staff has concluded: (1) that the five-year storage authorization requested by PP&L has utility independent of any further actions which might be taken with regard to storage and disposal of LLRW generated at SSES; and (2) that approval of the five-year authorization requested by PP&L will not prejudice NRC's consideration of any such future actions. Accordingly, the environmental effects of future actions which might be taken with regard to storage and disposal of LLRW generated at SSES have not been evaluated except to the extent stated in the preceding paragraph.

The Environmental Impact Appraisal is tiered on the Final Environmental Statement¹ (FES) prepared for the operation of the SSES. The FES is available at the NRC Public Document Room at 1717 H Street, N.W., Washington, D.C. and the NRC Local Public Document Room established in the Reference Department, Osterhout Free Library, 71 South Franklin Street, Wilkes-Barre, Pennsylvania 18701.

1.2 Need for the Proposed Action

1.2.1 Background Information

At the time the SSES was planned, LLRW from operating power reactors in the eastern U.S. was generally packaged and shipped to a low-level waste disposal facility operated by Chem-Nuclear Systems, Inc. at Barnwell, South Carolina. However, significant restrictions have been placed on the amount (50% reduction) of packaged LLRW that will be accepted at the Barnwell site². The near-term availability of alternative disposal sites at Beatty, Nevada and Hanford, Washington has also become less certain³. Although deliberations are being held across the country for establishing state and regional disposal sites, operation of the additional LLRW disposal sites is uncertain before 1986-87.

Routine operation and maintenance of the SSES reactors will result in the generation of LLRW. This waste consists of a variety of radioactively contaminated material such as paper, rags, protective clothing, etc., which

are collectively described as dry active waste (DAW). Low-level radioactive waste also includes process wastes such as filter-treatment sludges, spent-filter cartridges, and spent ion-exchange resins. Based on the experience at other BWR operating plants, the SSES is expected to produce about 60,000 ft³ of LLRW per operating year for two units (assuming no allowance for volume reduction other than trash compaction)⁴. PP&L has been able to obtain up to 5,000 ft³ per month at Chem-Nuclear's Barnwell burial site on a first-come, first-served basis. For the month of February 1983, however, the space will be for only a few hundred ft³. At this time PP&L has a contract with Hittman Associates for waste management services which includes LLRW shipping. In view of the uncertainty of space at Barnwell, PP&L is considering shipment of wastes to Beatty, Nevada and/or Hanford, Washington. Hittman Associates, however, does not have a sufficient number of shipping casks to fulfill long-distance shipping requirements. PP&L, therefore, is negotiating with another vendor for similar waste management services which would provide for the additional shipping cask requirements. Should shipping casks become sufficiently available to render shipment to western disposal sites viable, the shipments will have to meet the requirements of those sites.

1.2.2 Need for the Proposed Action

The need for the Proposed Action is implied in the foregoing section on background information. Additionally, enactment of the Low-Level Waste Policy Act by Congress in December, 1980⁵ encourages states to form regional compacts for the purpose of establishing regional plans and sites for the management and ultimate disposal of low-level radioactive wastes. One provision of this Act would allow regional disposal sites to exclude waste from non-member states after 1986.

The Southeastern States have progressed the farthest toward formation of a Southeast Interstate Low-Level Waste Management Compact. South Carolina has agreed to host the disposal site and Barnwell is likely to be the site.⁶ The Northwestern States are also initiating proposed plans for formation of a Northwestern States' low-level waste management compact.

At the present time Pennsylvania is not a member of any state compact for the regional management of LLRW. The legislative bodies of the Northeastern States, including Pennsylvania, have recently received copies of preliminary plans for establishment of a Northeastern States' compact for the management of regional LLRW. In the past, formation of such interstate compacts has been a time consuming procedure. Therefore, if the Northeastern States have not established a regional LLRW disposal facility by 1986 and the Southeastern and Northwestern States' compacts elect to exclude LLRW from non-member states at that time, PP&L SSES waste management problems could become further complicated. Faced with this possibility, PP&L feels alternative waste management plans need to be developed now.

In view of these above mentioned uncertainties, the applicant has proposed to establish an onsite LLRWHF with the capacity to temporarily store LLRW generated for up to four reactor-years of operation per unit. The use of this facility would only be necessary if offsite disposal were not available. Permanent retention of these wastes in the proposed facility is not planned. The only wastes to be temporarily stored are those low-level solid wastes that are incidental to the production of power by the SSES.

2.0 DESCRIPTION OF THE PROPOSED ACTION

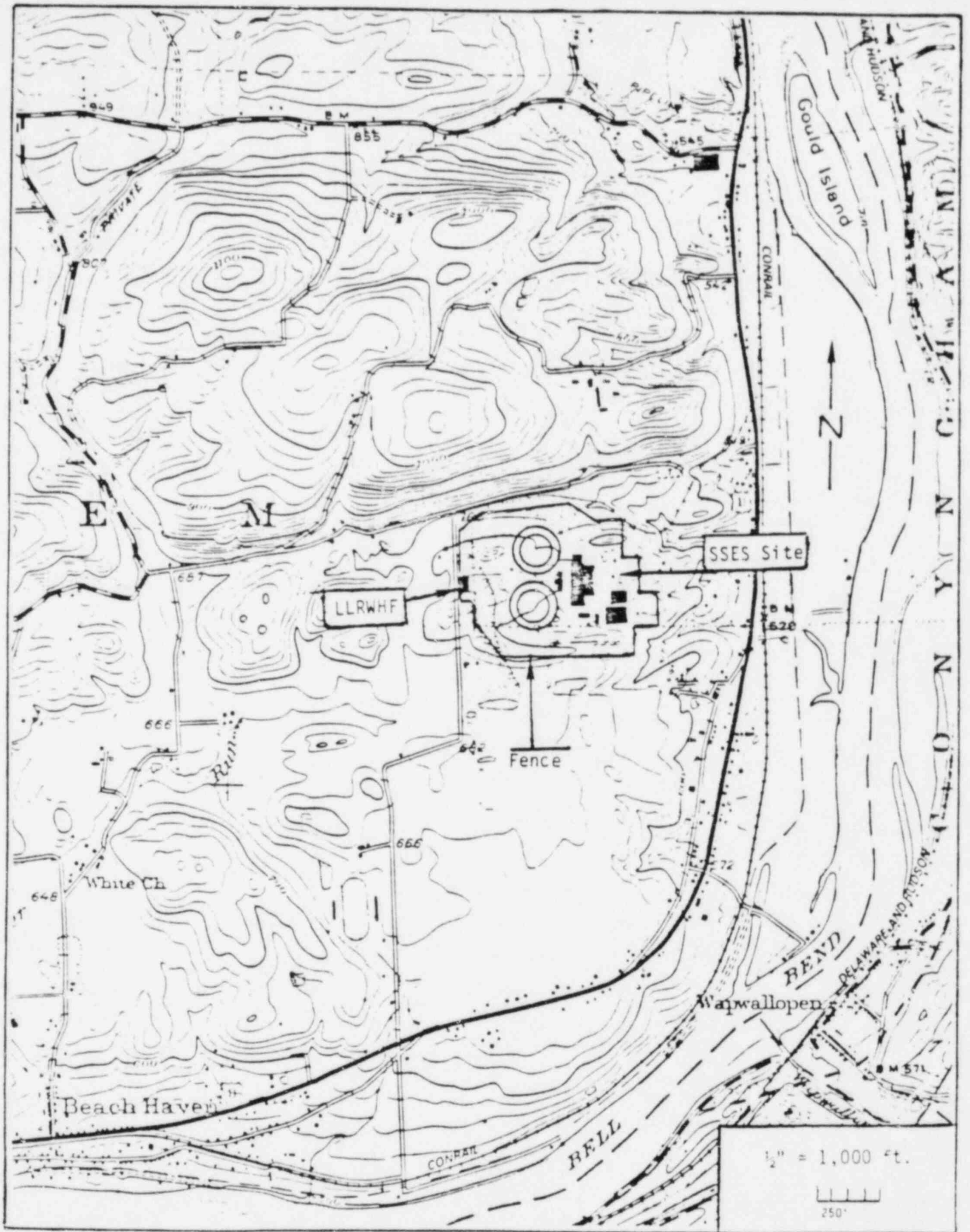
The proposed action is the construction and operation of a Low-Level Radioactive Waste Holding Facility. The LLRWHF is located on about two acres of ground on the SSES site. It is 1,000 ft west of the Unit 1 and Unit 2 cooling towers and within both the site fenced and exclusion areas. The western side of the LLRWHF is 75 ft inside the western fence boundary and about 95-100 ft east of the Salem Township Road No. 7436, which bisects the PP&L property in a north-south direction (Figure 2.1). The elevation of the LLRWHF is at 726 ft above mean sea level (726 ft msl).

Construction of the LLRWHF involved site preparation and building an integrated three-area holding structure. The LLRWHF is an above-ground, concrete structure entirely enclosed in a structural steel frame building with metal sides and roof. The LLRWHF is not a safety related structure and is classified as a Non-Seismic Category I structure (i.e., one whose failure would not release significant amounts of radioactivity and would not require reactor shutdown).⁷

2.1 Description of the LLRWHF Site

2.1.1 Description of the LLRWHF Site Preparation

The area was cleared of vegetation (principally grasses and scrub brush) then grubbed to remove remaining roots. This was followed by grading to achieve a uniform construction site elevation of 726 ft msl. During this process, and some limited trenching for the placing of foundation grade beams, utility lines, e.g., fire-fighting water, etc., about 16,500 yd³ of earth was moved. Run-off was an insignificant concern due to original flat character of the small area involved. There was no requirement for any significant excavation as the foundation consists of an 18-in thick reinforced concrete slab on grade with 4 ft deep grade beams around the perimeter of the structure and underneath the vault wall locations. Basically, the site preparation was a surface cut and fill type operation with the floor slab placed on in-situ earth or compacted soil.



LLRWHF Location
Figure 2.1

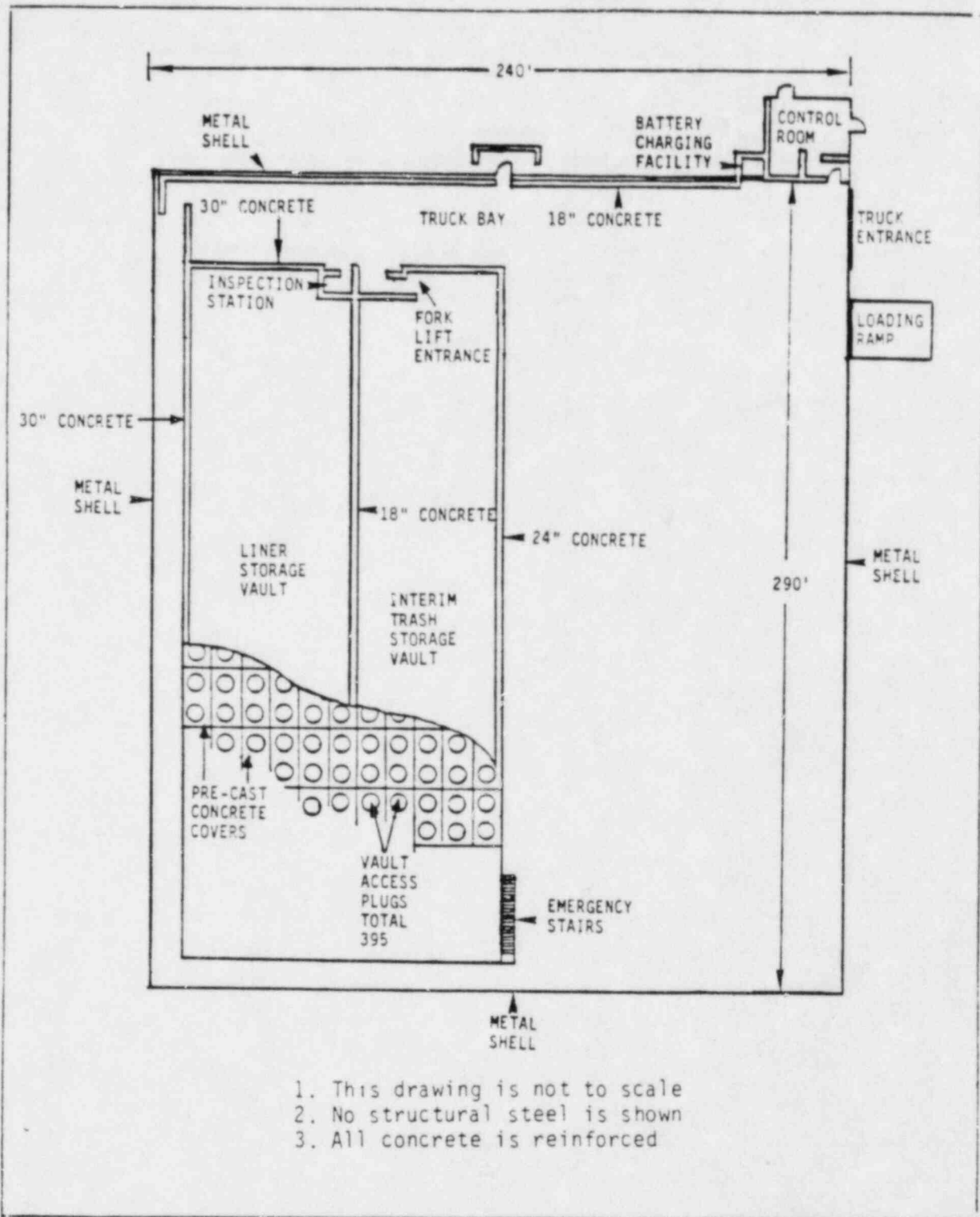
2.1.2 Description of the LLRWHF

Provisions for the interim storage of LLRW consist of one building with one area designated for holding DAW walled from two other areas, each separated by a wall, for holding solidified evaporator bottoms, resins and sludges in liners.

The LLRWHF is a structural steel frame building with uninsulated metal siding and roofing to provide weather protection. The overall dimensions of the facility are 240 ft by 290 ft with the long axis oriented north-south. The building centerline height is 42 ft. The metal siding and roofing is designed for a nominal wind load 20 pounds per square foot (psf) and a snow load of 30 psf. The steel frame is designed for wind and snow loads plus UBC Seismic Zone I loads, a 30-ton bridge crane, a 10-ton monorail, and dead loads. The building encloses a system of reinforced concrete waste storage vaults. For initial facility operation, two concrete vaults are provided for storage of waste liners and trash and are located in the western half of the building. During this initial operation, the eastern half will remain an open, unoccupied area. An additional concrete vault will be constructed over the eastern half of the building at a later date to accommodate additional trash storage.

The reinforced concrete vaults provided for initial operation consist of 17 ft high concrete walls which are 30-in thick on the north, west, and south sides and 24-in thick on the east side. There is an 18-in thick wall which divides this area into two separate vaults. This entire area is covered by 18-in thick precast concrete panels with a total of 395 circular plugs which will be individually removed while a waste liner is being placed in or retrieved from storage. These precast panels are supported by a structural steel framing system. Both the precast panels and framing system are designed for either a 100 psf uniform load or a 58 kip load from a waste liner and its shielding (shield bell) resting at individual locations, whichever is greater. The walls of this area are designed to withstand a total tornado pressure of 300 psf⁷.

For initial operation, waste liners will be stored in the west vault and trash in the adjacent vault, Figure 2.2. An inspection area is provided for waste liner inspections at any time. In the adjacent vault, where trash



Initial Configuration
 Figure 2.2

will be stored on an interim basis, a labyrinth is provided for radiation shielding and it will allow access by a forklift truck into this interim vault. In addition, an emergency exit is provided in the southeast corner of the vault to be used for interim trash storage. When the interim vault is converted to waste liner storage vault, an inspection station will be added and the emergency exit closed.

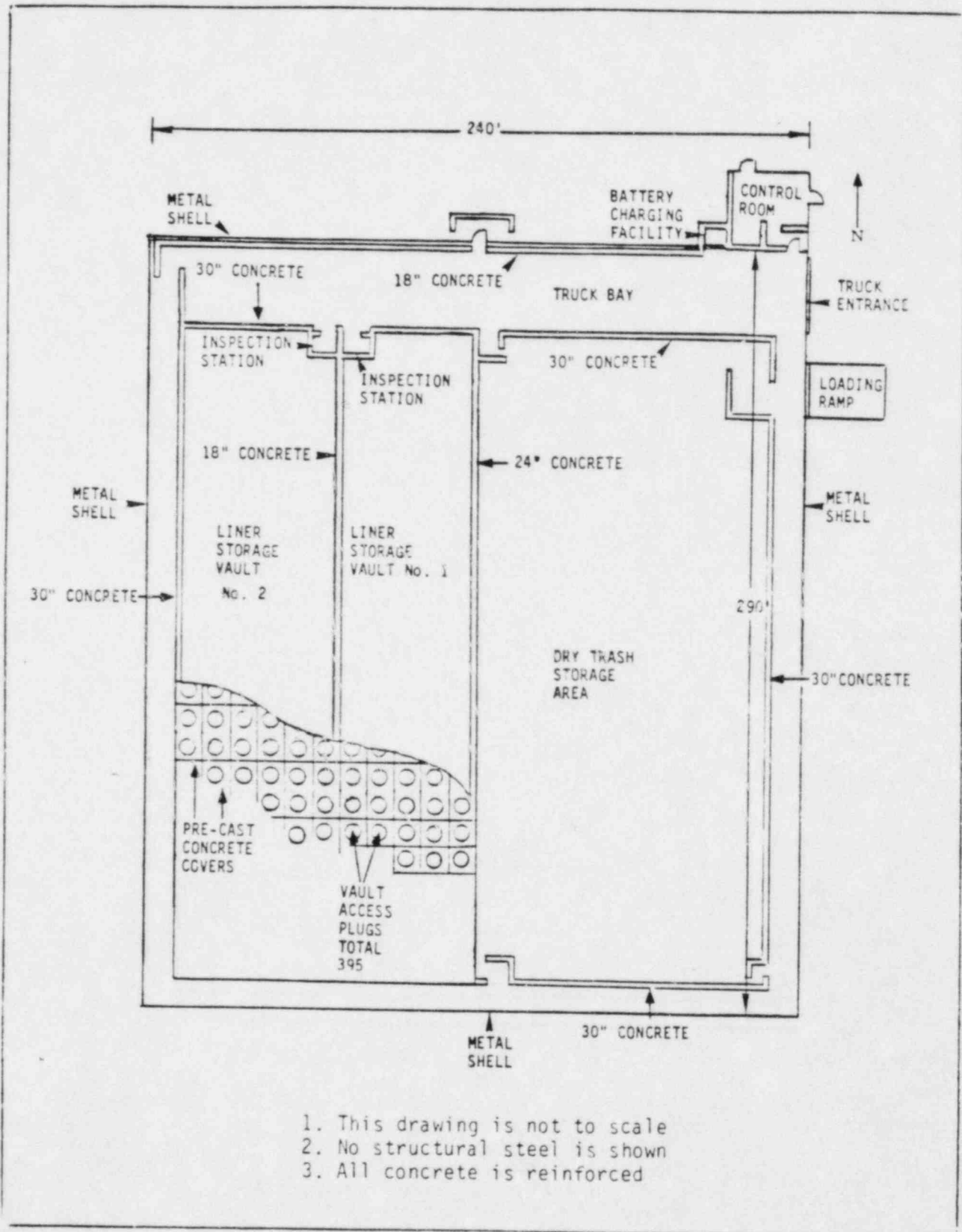
When either the interim trash vault or the liner storage vault approaches half-full capacity, construction will begin on an additional concrete vault in the eastern portion of the building (Figure 2.3). The additional vault area will be enclosed by 30-in thick concrete walls which will be 24 ft high on the north, east, and south sides with the east liner storage vault wall being extended up to form the west side. This vault will be covered by a poured-in-place, 12-in thick, concrete slab supported on metal decking over a structured steel framing system. The walls will be designed to withstand a total tornado pressure of 300 psf. The roof will be designed for a live load of 20 psf.

An 18-in thick concrete wall is located along the north side of the truck bay, Figure 2.4. This wall is 11 ft high in one section and 23 ft high in another to provide shielding during DAW container and waste liner storage or retrieval. The truck bay wall is designed for a nominal 20 psf wind load or UBC Seismic Zone I load, whichever is greater.

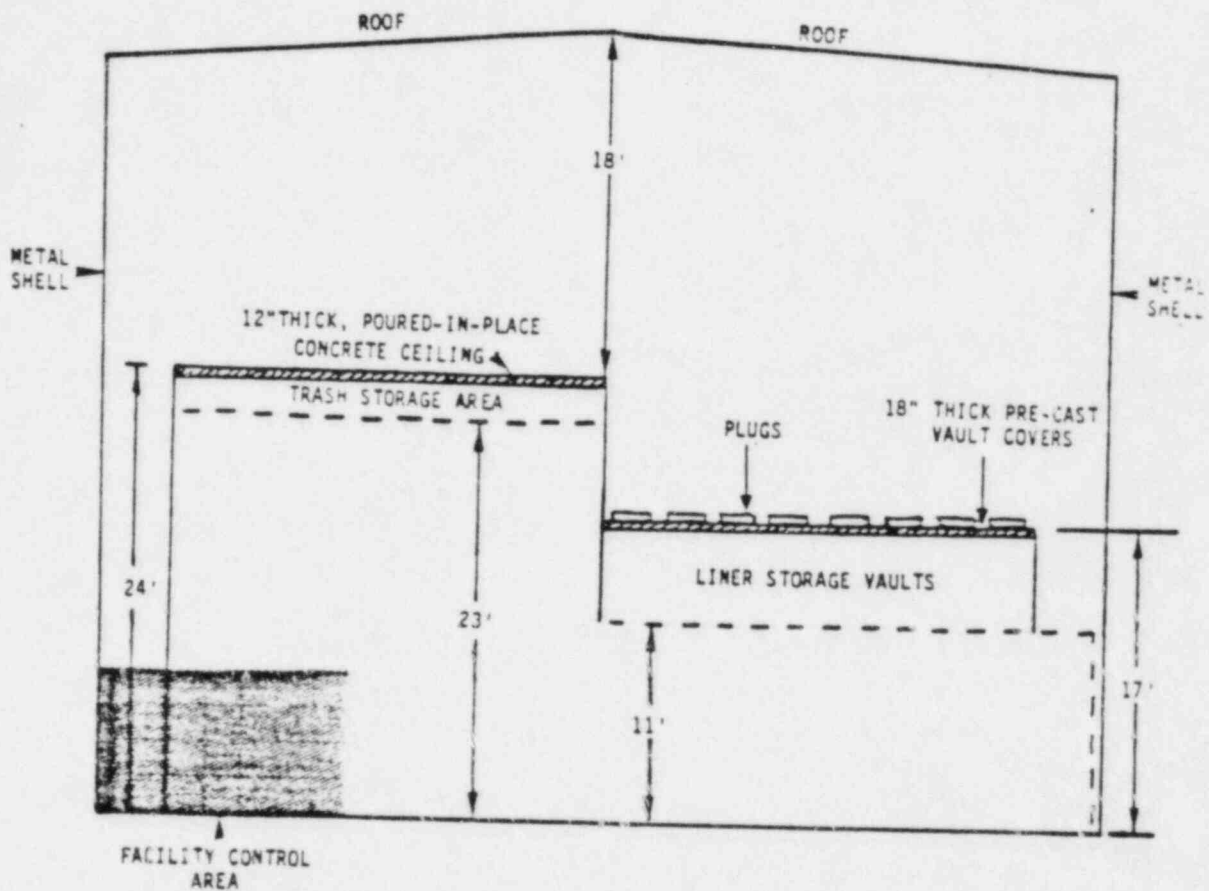
A control room is located at the northeast corner of the facility. It has 18-in thick concrete walls on the south and west sides and metal siding with insulated sheetrock walls on the north and east sides. The ceiling is insulated acoustical panels below the metal roofing.

A battery charging station and parking area for a forklift truck is located adjacent to the west wall of the control room. It has 18-in thick concrete walls with a rollup door into the truck bay. The roof is insulated metal roofing.

A rollup door located at the northeast corner of the building will provide vehicle access to the truck bay. Next to the truck access there is a loading dock which will allow level access to an enclosed van or trailer for offloading with a forklift. This access is also provided with a rollup-type



Final Configuration
 Figure 2.3



1. The drawing is not to scale.
2. The drawing is exaggerated vertically.
3. Structural steel and bridge crane not shown.
4. The dashed lines indicate the wall on the north side of the truck bay.
5. The drawing shows the LLRWHF as if the north end of the metal building was removed.

LLRWHF - Final Configuration
 North End
 Figure 2.4

closure. Personnel access and egress doors are provided to satisfy operational and safety requirements.

A curb around the perimeter of the building, i.e., inside the metal shell but outside the storage vaults, will contain any liquid such as rainwater or fire sprinkler water that may be introduced into the building. The curb is designed to retain the volume of fire protection water that would be released if all the sprinklers were actuated for one-half hour. A system of floor drains and sump will ensure drainage of additional flow. This system will route such water to a sump in the offloading area so that it can be sampled for contamination and collected for disposal. Ramps are provided for vehicular traffic over the curb. The floor, curbing, sumps, and shield walls of the facility will be coated with a decontaminable material to a height equal to the height of the curbing.

The facility is provided with an active ventilation system. The system is so designed that it moves air generally in an upward direction, away from the equipment operators, removes noxious or irritating exhaust fumes whenever internal combustion engine powered machinery is operating inside the facility and prevents excessive heat build-up from the roof in the summer.

The ventilation system for the storage areas and truck bay will not provide any heating or air conditioning for the facility. It will also not provide any humidity control.

The facility control room is provided with heating and air conditioning which normally will be required when occupied while LLRW is being loaded or unloaded at the facility.

The battery charging station is provided with special ventilation for preventing hydrogen gas build-up.

2.1.3 LLRWHF Site Support and Utilities

Electrical power for the LLRWHF is supplied by PP&L. There is no backup power for this facility. All power for the facility is distributed at appropriate levels from the facility control room.

Batteries are used for power to the emergency exit lighting, the transponder for the fire alarm system and the annunciator system.

One telephone with a main plant extension is located in the LLRWHF control room. The control room and storage areas are furnished with an extension of the main plant intercommunication system with paging station and speakers. Public address (PA) handset stations for conversation and paging are located in the control room, offloading area, and the inspection station. One PA cone type speaker is located in the control room. PA horn speakers are arranged in the truck bay and storage areas (including interim trash storage vault) such that paging or alarm can be heard when the facility is at full capacity.

Water supply for the LLRWHF, which consists solely of a fire-fighting water main, is provided from the SSES water supply. This is described in further detail in a following subsection (2.4.1).

The LLRWHF is, as previously noted, within both the exclusion and fenced area of the SSES and is therefore protected by that security system. The LLRWHF will remain locked at all times except during loading or retrieving of stored materials. Access will be administratively controlled.

2.2 Waste and Waste Container Description

2.2.1 Waste Description

Two types of low-level radioactive wastes will be held in the LLRWHF; 1) dry active waste which is characterized as contaminated material containing sources of radioactivity dispersed in small concentrations throughout large volumes of inert substances and has no free-standing liquid. It generally consists of high efficiency particulate air and cartridge filters, rags, clothing, small equipment and other dry materials. DAW is also referred to as "dry trash" or simply "trash". 2) Solidified waste which is characterized as wet dewatered waste in the form of evaporator bottoms, resins and sludges that have been immobilized in cement in steel containers and contain less than 0.5 percent of free-standing water by waste container volume. The solidified wastes are further identified as condensate demineralizer (CD)

and reactor water clean-up (RWCU). The total curie count of the CD containers (liners) is somewhat less than that of the RWCU liners, both at the time of storage and after four years in storage.

2.2.2 Waste Container Description

There is considerable variety in the size and shape of steel waste containers used in the nuclear industry; and it is anticipated that a variety of types, suitable for disposal, will be held during the life of the LLRWHF. The most likely containers which will be stored are listed below.

Manufacturer	Designation	Usage	Volume	Dimensions
Hittman	HN-100	Solid. Waste	163 ft ³	72-3/8"x72-3/4" High
Hittman	HN-100	Solid. Waste	83 ft ³	72-3/8"x40" High
Chem. Nuclear	14-195	Solid. Waste	200 ft ³	76"x79" High
	55 gal drum	Trash (DAW)	7.5 ft ³	1.95'x2.9' High
Container Prod. Corp.	B-25	Trash (DAW)	96 ft ³	50" High x 46" Wide x 72" Long

2.3 Description of Operations

The LLRWHF is designed for the contingency storage of wastes generated by the SSES for the equivalent of eight reactor years (four calendar years both reactors operating). The duration of material storage (DAW or solidified waste) for an individual container will not exceed four calendar years.

A solidified waste container (liner), decontaminated for shipping to the standards of 40 CFR 173.397, will be loaded aboard a flat bed truck, or tractor-flat bed trailer, at the SSES Radwaste Building. The container will then be covered with a shield bell to minimize radiation exposure of operating personnel.

Two shield bells will be provided to accommodate different sizes of liners for transport to the LLRWHF. One is for liners approximately 72 in, outside

diameter (OD) by 40-in high. The second is for liners of two sizes, one approximately 76 in OD by 79 in high; the other approximately 72 in OD by 72 in high.

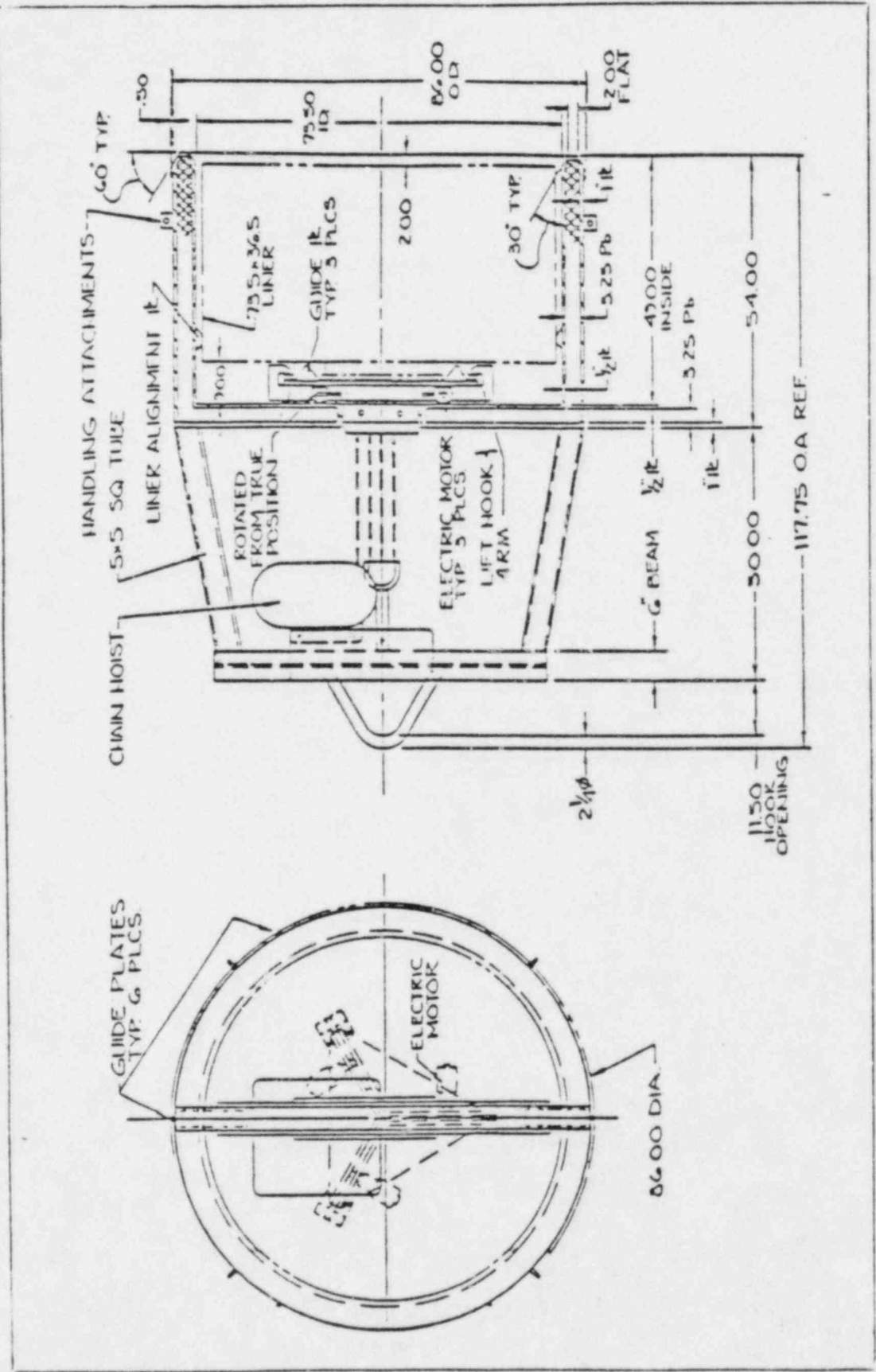
Each of the shield bells incorporate an electrically operated holding device for securing the liner within the shield bell for liner transport. The system includes three electric motors which drive worm gears to engage a ring beam attached to the top of the liner. Details of the CD and RWCU shield bells are shown in Figures 2.5 and 2.6, respectively.

Once loaded, the transport vehicle will proceed to the LLRWHF, enter the building via the truck entrance located in the northeast corner (Figure 2.2) and move westward along the truck bay until in proper relation to the position of the bridge crane, mentioned in subsection 2.1.2. Inside the LLRWHF, the shield bell will be lifted and moved by the bridge crane and will receive the necessary power and control signals via the bridge crane from a control panel located in the facility control room.

Once in proper position, and prior to lifting, the electric cable from the crane, which supplies power to the hold/hoist/release mechanism inside the shield bell, will be manually connected to its shield bell fitting. All personnel will then clear the area and the remainder of the procedure will be completed via remote control from the LLRWHF control room.

The LLRWHF 30-ton crane, with the 10-ton girder mounted monorail hoist, is provided with lights and a closed circuit television (CCTV) system to enable remote handling of vault shield cover plugs and shielded radwaste containers. The CCTV system consists of three cameras which have pan, tilt and zoom capability. Provision is also made for crane control from the truck bay floor while the crane is over the truck bay.

The 30-ton capacity crane main hoist will be used to lift shielded radwaste liners from the flatbed truck parked in the west end of the truck bay of the LLRWHF. The entire assembly, shield bell and liner, will be lifted by the crane main hoist and transported into the vault area for storage of the liners.



RMCU Shield Bell

Figure 2.6

The 10-ton monorail hoist will support the shield plug grapple used to engage and lift the vault shield plug. The bridge crane then will be moved to position the shield bell directly over the vault opening from which the shield plug has been removed (Figure 2.7).

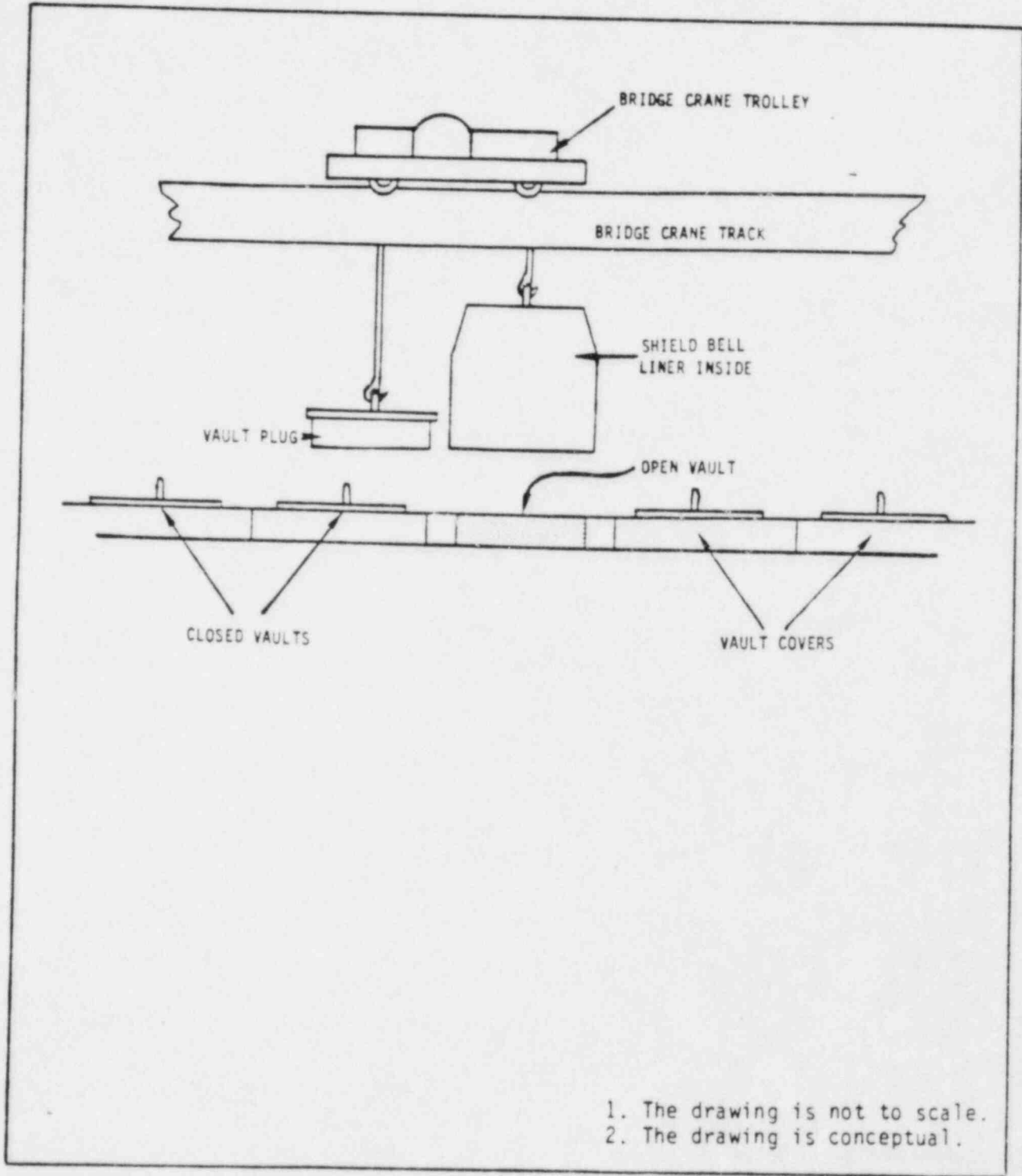
The shield bell will be lowered over the vault opening and will rest on the vault cover. The shield bell hoist, operated from the facility control room and powered from the bridge crane, will be used to lower the liner holding mechanism and liner into the vault, Figure 2.8. When the liner is in place in the vault, the liner holding mechanism will release the liner and be raised back into the shield bell. The shield bell will then be raised off the vault cover opening. The vault shield plug will then be replaced in the vault cover and the shield bell moved over and replaced on the truck for return to the main plant.

The procedure for removing liners from the vault for inspection, or inspection and shipping will essentially be a reversal of the loading procedure described above.

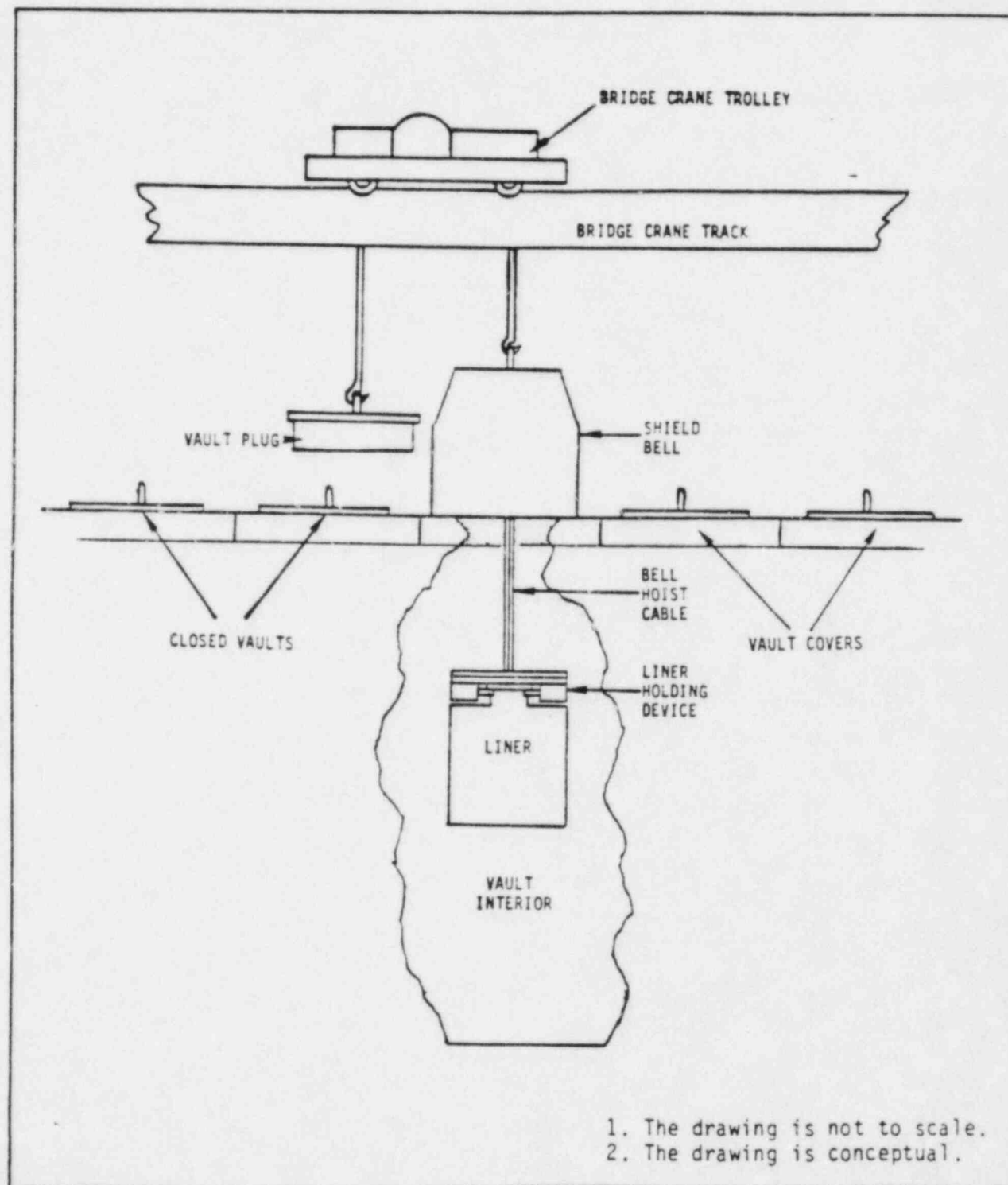
Dry trash will be packaged in the Radwaste Building in 55-gallon drums or steel boxes for shipment (it is anticipated that the majority of the dry trash containers will be the drums). These containers will be decontaminated in conformance with shipment standards, palletized, transferred to the LLRWTF by truck and offloaded at the facility loading ramp (Figure 2.2) by a battery-powered forklift. The palletized containers will then be transferred to the interim trash storage area (Figure 2.2) via the forklift which will be shielded to minimize operator exposure.

At the time the eastern half of the LLRWTF is completed, the palletized trash containers will be moved, via forklift, and stacked in that area. This will be a one-time operation.

When dry trash is to be removed for shipment during the initial, interim storage period, the retrieving forklift can load the transporting vehicle in the eastern half of the truck bay or at the loading ramp, whichever is most convenient for the operation. After the permanent trash storage area is completed, offloading and loading will be accomplished at the loading ramp.



Plug Removal and
Shield Bell Alignment
Figure 2.7



Liner Placement
Figure 2.8

During both the initial phase and throughout the life of the LLRWHF, the low-level DAW and cemented waste will be segregated. DAW will be stored in the trash storage vault and cemented waste in the solidified waste storage vaults. Further segregation of the waste containers within the vaults will also be used to take maximum advantage of the self-shielding properties of the waste material and to minimize exposure. To the maximum extent practicable, waste stored in the trash storage vault will be arranged with containers having contact dose rates of less than or equal to 30 mrad/hr along the vault walls and on the top layer of the storage area and containers with higher dose rates stored underneath. Similarly, to the maximum extent practicable, cemented waste stored within the solidified waste storage vaults will be arranged with containers having contact dose rates of less than or equal to 3 rads/hr stored next to the vault walls and on the top layer. Containers with a contact dose rate greater than 3 rads/hr will be stored inside this perimeter.

PP&L states that, "sufficient records will be identifiable and retrievable to furnish evidence that the operational procedures have been implemented. Records will be maintained in accordance with Susquehanna SES Administrative Procedures and will, as a minimum, include container identification, date of placement in the LLRWHF, location in the LLRWHF, waste type, curie content and dose rate."

There will be an active container surveillance program included in the LLRWHF operational procedures. This program will require one percent of those solidified waste containers in storage over one year be inspected quarterly; however, the number of containers inspected quarterly is not to exceed ten.

The facility is equipped with liner inspection stations where inspections required by 49 CFR 170 can be performed on the solidified waste containers immediately prior to shipment and as required for routine monitoring. The inspections will include the following:

1. Visual inspection of the container for deterioration, leakage, or other conditions which might preclude shipment, disposal, or might require repackaging.

2. A contact radiation dose reading on the container surface.
3. A radiation dose reading at three feet from the outer surface.
4. An outer surface contamination smear.
5. Weighing of a liner.

The inspection station provides shielding for the person performing the inspections and remote operating capability for these functions to minimize the radiation exposure per ALARA principles. The inspection station compatible with the loading system of the facility is provided in one solidified storage vault bay with the provisions for installing another in the interim trash storage bay in the future.

The inspection station is equipped with the appropriate lighting to allow these inspections. Provisions are made in the facility for electrical power for the station at the location it will occupy.

2.4 Description of Safety Systems

The LLRWHF, considered as a system, provides safe contingency storage of low-level radioactive waste. Its location in an area of low local population, its separation from the public by location within the SSES exclusion and fenced area, the SSES security system, controlled access, and building construction are all safety features. Other safety features, designed to provide safe storage operations include: the building lighting systems, the bridge crane, the inspection station, the HVAC systems, the floor drain system, the fire protection system, the area radiation monitoring system, and the alarm and annunciator system.

2.4.1 Fire Protection

Initially, infra-red smoke detectors will be provided in the interim trash storage vault. Later, when the final trash storage area in the east side of the LLRWHF building is occupied, these smoke detectors will be relocated. As trash is moved, additional detectors will be added where required to assure an adequate detection system.

There is also a photoelectric smoke detecting system. The photoelectric-system is comprised of spot type ceiling mounted detectors of the conventional type operating on the light scattering, photodiode principle. They are located in the control room and the truck bay and will alarm when smoke density obscures light by 1.5% per foot.

The fire alarm system is an extension of the existing plant-wide Simplex Time Recorder Company multiplex system. The LLRWHF incorporates the use of the Simplex basic transponder at the control panel for the local facility. It provides both normal and emergency backup power to the system from its own internal power supply.

All external fire alarm circuits from the transponder are electrically supervised against open and short circuits. In addition, the power supplied for the operation of the infra-red smoke detection system and the spot type smoke detectors is also supervised. Any malfunction is alarmed locally and the signal retransmitted to the central SSES reactor control room over supervised multiplex circuits from the Central Processing Unit (CPU).

The control panel is located in the control room and is provided with lighted zone annunciation and alarm bell. In addition, a slow whoop horn (rated at 100 DB) is located in the storage area. All signals received by the facility control room panel's external circuits are retransmitted to the CPU by multiplex.

The fire suppression system is a dry pipe sprinkler system. The dry pipe sprinkler systems are hydraulically designed to discharge at a density of 0.25 gpm/ft² over the most remote 3000 ft². The design complies with NFPA #13 and provides protection to the truck bay and all areas where DAW is stored. Sprinkler heads in the storage area are equipped with fusible links

rated at 286°F. When the links melt upon high heat, the air in the piping system is released allowing it to fill with water and discharge at the design rate. A single AC-powered air compressor located near the west valve house supplies air to the dry pipe systems through the automatic filling system at each valve. Air pressure is maintained in the sprinkler system piping at approximately 50 psi to maintain the water inlet valve in a closed position and prevent freezing of the protection system.

Water is supplied from the existing fire protection system by a 10-in mortar-lined, ductile iron fire protection line. The water supply is capable of supplying a minimum of 1500 gpm at 100 psi. Fire hydrants are provided and equally spaced at approximately 300 ft intervals around the building perimeter. Hydrants and hose houses are identical to existing plant equipment.

2.4.2 Occupational Monitoring and Radiation Protection

The radiation monitoring system is designed to monitor the general area radiation levels at various locations inside the trash vault, the off-loading area, and the LLRWHF control room. The radiation monitor is a gamma measuring device that has a sensor, an indicator, and power supply. The monitors' sensors are strategically located on the walls of the trash storage area, control room, and truck bay. There are two area radiation monitors in the truck bay (one near the inspection station and one near the catch basin), and one in the control room. During the interim when the solidified shielded vault is used to store trash, an area radiation monitor is located near the north entrance and another near the emergency stairs at the south end.

Five radiation monitors will be in use initially. When the future dry trash storage area is in use, four additional area radiation monitors will be installed. One area radiation monitor will be near each of the four entrances. When all the trash is removed from vault No. 1, the two monitors may be removed.

Radiation levels detected by the sensors will be sent to indicators located in the facility control panel. Nine radiation monitors may be necessary

when both trash vaults are in use, but channels for twelve monitors are provided.

Radiation protection is provided by the previously described (illustrated in Figures 2.2, 2.3 and 2.4) two types of shielding:

1. Fixed shielding for the in-place stored material
2. Transient shielding for the waste containers for transport to the facility and for loading and unloading in the waste storage areas.

The fixed shielding consists of concrete storage vaults for the cemented waste and DAW, concrete walls in the truck bay area and concrete walls for the control room. The storage vault walls are reinforced concrete. The trash storage vault has a poured-in-place concrete roof and the solidified waste storage vault pre-cast concrete covers with removable plugs. A reinforced concrete wall is provided for shielding on the north and west sides of the truck bay area. The control room has reinforced concrete along the south and west walls.

The transient shielding for the cemented wastes consists of portable shielding devices (shield bells). The transient shielding for the DAW consists of a shielded forklift.

Additional radiation protection is provided by the following:

1. The capability to accomplish solidified waste loading/unloading and container inspection nearly one-hundred percent remotely,
2. Designated radiation zones within the facility.
3. Posted radiation area control access points.
4. Waste container storing scheme, i.e., containers with the lowest levels of surface activity stored around the area perimeter and on top.

5. Controlled/limited access.

2.5 Environmental Monitoring Program

The environmental monitoring of the LLRWHF operation will be included in the SSES monitoring program presented in Table 2.1.

Table 2.1. SSES Radiological Environmental Monitoring Program^a

Sample Type	Location	Collection Frequency ^b	Analysis	Analytical Frequency ^b	Lower Limit of Detection ^c	Units
<u>Air Particulates</u>						
SS-AP-553	North of I.A.					
SS-AP-11A1	SW corner of site					
SS-AP-981	Near transmission field	M	Gross beta	M	0.01	pCi/m ³
SS-AP-12E1	Berwick Hospital		Gamma emitters	QC	0.01	pCi/m ³
SS-A1-7H1	PP&L roof					
<u>Air Iodine</u>						
SS-A1-553	North of I.A.					
SS-A1-11A1	SW corner of site					
SS-A1-981	Near transmission field	M	I-131	M	0.07	pCi/m ³
SS-A1-12E1	Berwick Hospital					
SS-A1-7H1	PP&L roof					
<u>Surface Water</u>						
SS-SW-12D	At I.A.	M	Gamma emitters	M	15	pCi/L
SS-SW-12F1	Berwick Bridge		H-3	Q	2,000	pCi/L
<u>Drinking Water</u>						
SS-PWT-12F2	Berwick Water Co. (treated)	M	Gross beta	M	4	pCi/L
SS-PWT-12H2	Danville Water Co. (treated)		Gamma emitters	M	10	pCi/L
			H-3	QC	1,000	pCi/L
<u>Fish^d</u>						
SS-AQF-1N1	Outfall	SA	Gamma emitters	SA	130	pCi/kg (wet)
SS-AQF-2G1	Upstream					
<u>Sediment</u>						
SS-AQS-11C1	Hess Is. area	SA	Gamma emitters	SA	150	pCi/kg (dry)
<u>Milk</u>						
SS-M-10C1	Farm					
SS-M-12B1	Schultz Farm	2/M ^e	I-131	2/M ^e	1	pCi/L
SS-M-12B2	Young Farm		Gamma emitters	2/M ^e	15	pCi/L
SS-9G1	Crystal Spring Dairy					
<u>Food Product</u>						
SS-PP-5B1	Farm	A	Gamma emitters	A	130	pCi/kg (wet)
<u>Direct Radiation</u>						
SS-ID-3S1	Susquehanna River					
SS-ID-4S1	Susquehanna River					
SS-ID-5S1	North of I.A.					
SS-ID-7S1	On 230-kV tower	Q	Gamma dose	Q	--	BRM/std. mo.
SS-ID-11S1	On 230-kV tower					
SS-ID-9B1	Near transmission field					
SS-ID-12E1	Berwick Hospital					
SS-ID-7H1	PP&L roof					

^aFrom enclosure to letter from W.W. Curtis, PP&L, to D.E. Sells, NRC, 10 September 1979.

^bFrequency Codes: M=monthly; Q=quarterly; SA=semiannually; 2/M=twice each month; C=composite

^cLLDs per Draft Radiological Effluent Technical Specifications (BMR), NUREG-0473, October 1978.

^dImportant classes of fish will be analyzed separately (bottom feeders and game fish).

^eMilk collected and analyzed semi-monthly from April through October, monthly during other months.

Source SSES FES, Table 5.1

3.0 OPTIONS AND ALTERNATIVES

In the following sections, possible waste management options available to PP&L, involving the LLRW Holding Facility following the five-year license term, are presented. Each option would have some environmental impacts that may be considered a result of the proposed action and therefore are being considered in this Environmental Impact Appraisal. Additionally, since each option would require some NRC licensing action, consideration is given to whether or not granting a license for the proposed action would restrict the NRC's decisional alternatives or limit its ability to withhold approval of any subsequent related application.

Alternatives to the proposed action are also presented.

3.1 Options Beyond the Five-Year License Term

Options available to PP&L following the five-year license term are presented so that the proposed action can be evaluated for possible environmental impacts at the end of the license term and at the end of the life of the LLRWHF.

3.1.1 Options at the End of License Term

At the end of the five-year license term, several options involving the LLRWHF for managing LLRW at the SSES may be available to PP&L. Briefly they are:

1. Renew license for continued operation until the eight reactor-year design capacity is used, or
2. Renew license for possession only; no new LLRW stored, or
3. Renew license for further operation; remove old LLRW and store newly generated LLRW, or
4. Ship stored LLRW for disposal and terminate license.

The first option could be exercised if, at the end of the five-year license term, the design capacity of the LLRWHF had not been fully used. This is likely to be the case as the No. 2 reactor will probably not be in commercial operation for approximately two years. This option would involve the same activities as the proposed action, described in Section 2.0.

The second option, to renew the license for possession only with no new storage of LLRW, would involve considerably less activity than the proposed action. Until ultimate disposition of the LLRW, the activities associated with this option would be those of the container integrity, facility safety and environmental monitoring programs.

The third option is also a likely one in view of PP&L's plan to not hold any individual waste container for more than four years. This option would involve basically the same activities as the proposed action.

The fourth option would essentially be renewing the license for possession only while the LLRW was removed for disposal. The activities would be similar to the proposed action except no new LLRW would be placed in the vaults. When all the LLRW was removed and appropriate decontamination or decommissioning accomplished, the license would be terminated.

The particular option PP&L may select will depend upon many factors which are presently uncertain. Such factors include:

1. Construction or operation schedule, or both,
2. LLRWHF usage (i.e., PP&L stores all LLRW or only stores on an as-needed basis),
3. Container integrity,
4. Formation of Regional Compacts for LLRW disposal,
5. Availability of LLRW disposal, and
6. Volume reduction methods, licensing, and economics.

Based on present considerations, PP&L has stated that its intention is to remove the LLRW and ship for disposal as space is available.

The evaluation of these options may be found under Environmental Assessment, Section 5.2.

3.1.2 Options at the End of Life-of-Plant

The life span of the LLRWHF is currently planned to be 40 years, but, due to the substantial construction of the vaults, they could serve their planned purpose for many years beyond the design time. If, on the other hand, offsite LLRW disposal services are sufficiently available, PP&L would discontinue to use the LLRWHF. In either case, some disposition of the facility must be made at end of plant life or prior thereto.

At the present time, PP&L has not specified any particular plan for decommissioning of the LLRWHF. The following options would, however, appear reasonable:

- o Placing the LLRWHF in an inactive state (i.e., possession only with no planned operations) and providing for security and environmental monitoring for an indefinite time;
- o Sealing all radioactive material inside the storage facility (utilizing a material such as concrete) in a technique known as entombment; and
- o Retrieving all radioactive waste and transporting all of this material to a disposal facility, then decontaminating as necessary, leaving the area in as close to its original state as possible.

There may be other decommissioning methods developed that are more advantageous than the above. Whatever option is chosen for decommissioning the SSES, the NRC will review PP&L's plan.

3.2 Alternatives to the Proposed Action

This subsection presents alternatives to the proposed action along with an evaluation of their viability. Four alternatives were selected for consideration. They are: no action, offsite operation of a LLRWHF, onsite interim storage in existing facilities and volume reduction. These alternatives were evaluated against the need discussed in Section 1.

3.2.1 No Action

The no action alternative is defined as the use of the SSES design-basis, onsite storage capacity for one-month interim storage of LLRW (NUREG-0776, NRC 1981) followed by shipment. Under this alternative no other alternatives, including the proposed action, would be considered. The success of this alternative would depend on the continued availability of offsite commercial LLRW disposal sites. The SSES plant design provided very limited storage capacity based on this assumption. Any interruption in shipment of LLRW could potentially shut the plant down.

The positive aspects of the no action alternative would include a savings of approximately \$23 million in LLRWHF construction costs and \$350,000 annual operating and maintenance costs. An additional benefit may include minimizing SSES occupational exposures through prompt offsite shipment of LLRW.

In recent years, LLRW disposal has been hampered by the unavailability of shipping casks, transportation problems, and restrictive disposal quotas (McArthur 1979). Space for waste disposal is expected to become increasingly scarce in the next few years as restrictions continue to be placed or are placed on the amount and type of LLRW the three disposal sites (Barnwell, South Carolina; Beatty, Nevada, Hanford, Washington) are willing to accept. As a consequence, interruptions in offsite shipments of radioactive wastes are possible, and operation of the station could be severely limited. Even if the plant was shut down, it would continue to generate some amount of radioactive waste requiring storage and ultimate disposal. Therefore, the no action alternative would limit the electric power generating capability of SSES and would not resolve the problem of LLRW storage.

3.2.2 Offsite Operation of a Low-Level Radioactive Waste Holding Facility

Offsite storage facilities would consist of the same facilities and would require the purchase of property for a site and also require obtaining additional permits. The land use impact from such a site would have to be evaluated and problems resolved prior to construction. Radiological and other monitoring programs independent of the SSES would have to be established. The increased waste handling and transportation requirements for offsite storage of the waste would add extra costs (in terms of both dollars and radiation exposure) above those for onsite storage. Offsite interim storage of the LLRW is concluded to be a less desirable alternative to the proposed action because all impacts of the proposed action would result in addition to those that would be specific to a new construction site including additional waste handling and transportation.

3.2.3 Onsite Interim Storage in Existing Facilities

The use of existing structures onsite for interim storage of the LLRW is a third alternative to the proposed action. Several areas were considered by PP&L as potential sites for interim storage of the waste.

Most areas identified as prospective storage locations would already be in use as equipment laydown, washdown, access, or storage areas. In addition, extensive handling of the LLRW containers and special lifting devices would be required so that some locations could be used. Other prospective sites would demand removal of hatches and evacuation of transfer areas. Some locations, in particular the refueling floor, would require outside transfer of containers. In the event of a forced outage, storage of LLRW on the refueling floor would hamper work by requiring additional shielding or removal of waste to permit worker access. The requirements could extend the duration of the outage. Multiple storage locations would make accountability of the LLRW inventory difficult.

Storage of the LLRW in-station would increase the radiation exposure of plant personnel. The overall background radiation levels in the plant would increase. Multiple storage locations dictate expanded radiation surveillance which means greater human contact and increased dose.

Nonradiation zones would have to be changed to radiation zones to accommodate the waste. The overall impact of interim in-station storage of LLRW would be to increase the radiation dose to employees. This would not be consistent with the policy of maintaining radiation exposures ALARA.

3.2.4 Volume Reduction

Another alternative to the proposed action would be for PP&L to reduce the volume of LLRW generated at SSES, for example by incineration before shipping it offsite, thus more effectively using PP&L's allotment at the offsite disposal facility. The NRC encouraged licensees to reduce volumes of LLRW for disposal through its Policy Statement on Low-Level Waste Volume Reduction issued in the FEDERAL REGISTER on October 16, 1981 (46 FR51100). A number of volume reduction techniques are in varying stages of development. Depending on the method selected, the time required for implementation could be lengthy because of requirements for testing and evaluation, construction, installation and licensing. For example, we estimate that an incineration system could take from three to five years to become operational. For this reason this alternative lacks immediate utility and therefore is not considered viable.

4.0 SITE CHARACTERISTICS

The SSES property occupies 1075 acres the center of which is at 41° 05' 30"N and 76° 08' 50"W. The station itself occupies approximately 120 acres and is located on a 602 acre plateau west of U.S. Route 11 and the Susquehanna River in Luzerne County, Pennsylvania. Berwick, the nearest town of significant size, is six miles southwest of the station in neighboring Columbia County. The relation of the station to the aforementioned features and Northeastern Pennsylvania is illustrated in Figures 4.1 and 4.2, respectively. A detailed description of the physical and environmental characteristics of the surrounding areas is presented in the SSES FES. The purpose of the following subsections is to summarize the pertinent information from the SSES FES and provide additional data in areas where new or supplemental information is relevant.

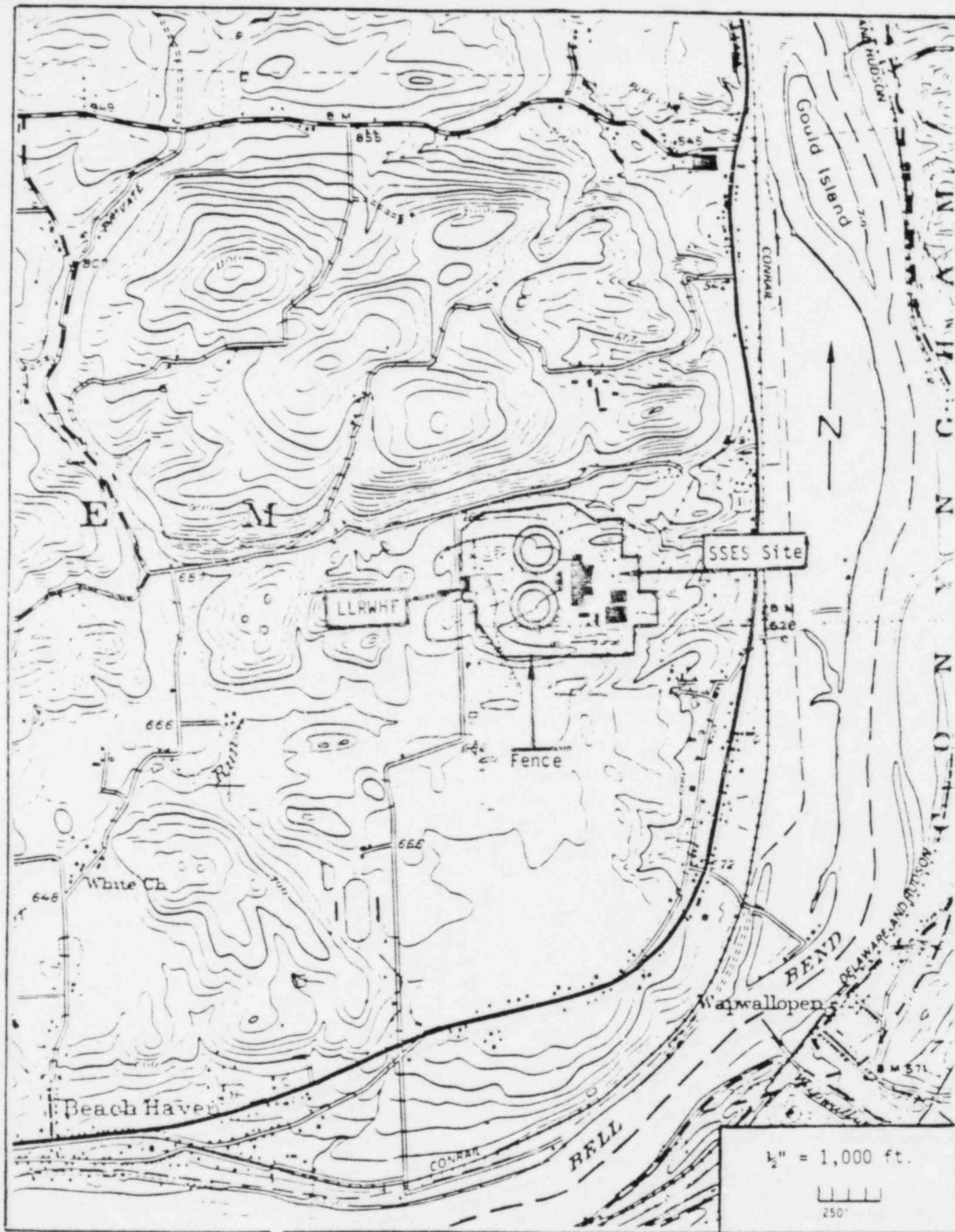
4.1 Demography

The immediate vicinity of the site is not heavily populated. The average population density out to five miles, within each of the 16 compass directions, is 117 persons. The Southwest sector, however, is the exception, with over 900 persons residing therein. The reason for this anomaly is that this sector includes a portion of the town of Berwick (population: 12,189).³ The population distribution out to 50 miles is shown in Table 4.1.8

4.2 Ecology

Areas adjacent to the SSES consist of a mixture of farm land, woods and scrub brush that have, and continue to support terrestrial, avian and aquatic species as described in the SSES FES.

Construction of the SSES was started in late 1973 and has continued with varying degrees of intensity since that time. The impacts to wildlife that did occur due to construction have stabilized. Conditions within the SSES fenced area are such that it is not particularly attractive to wild life, i.e., it is devoid of trees and ground cover.



SSES Location - Local

Figure 4.1



SSS Location - Eastern Pennsylvania
 Figure 4.2

Table 4-1

POPULATION OUT TO 50 MILES IN SIXTEEN COMPASS SECTORS

	<u>0 - 5</u>	<u>5 - 10</u>	<u>10 - 20</u>	<u>20 - 30</u>	<u>30 - 40</u>	<u>40 - 50</u>
N	113	3280	9322	9339	9448	5799
NNE	118	2090	11814	9734	11639	6914
NE	119	2188	125155	79771	149752	39706
ENE	118	2138	12230	17383	21957	10659
E	115	2113	9322	12203	18098	18740
ESE	116	2088	15738	13758	24651	82888
SE	117	2267	38202	16549	68742	189404
SSE	112	2060	18959	20881	39889	51441
S	115	2088	10054	20881	35785	51991
SSW	115	1282	5041	15368	27307	51802
SW	948	1377	3646	12857	30808	40332
WSW	133	16146	17485	14537	31109	20317
W	126	790	3646	7746	20067	12234
WNW	126	608	5673	4935	6820	65717
NW	111	2087	2744	1372	1299	6277
NNW	115	2088	7312	2171	5504	9438
Totals	2,717	44,690	296,343	259,485	502,875	663,659

Total population within 50-mile radius - 1,769,769 (Ref. 8)

4.3 Geology

The SSES site is located in the Penobscot Mountain area in the northern portion of the Valley and Ridge Physiographic Province. The province is characterized by intensely faulted and deeply eroded sedimentary rocks of Paleozoic age. Topographically, erosion-resistant sandstone formations form long narrow ridges; valleys were formed in the less resistant limestones and shales.

During the Paleozoic Era, the Appalachian Mountain region was a depositional basin collecting thick sediments. Sedimentation was interrupted several times by mountain-building activities climaxing in the Appalachian Mountains toward the end of the era. Since that time, the primary ongoing geologic process has been erosion.

Bedrock in the area consists of sandstone, siltstone, and shale of the Catskill formation of Devonian age. To the north, the Catskill formation is overlain by younger Mississippian and Pennsylvanian formations including anthracite coal beds. To the south, the Catskill formation is underlain by older sedimentary rocks.

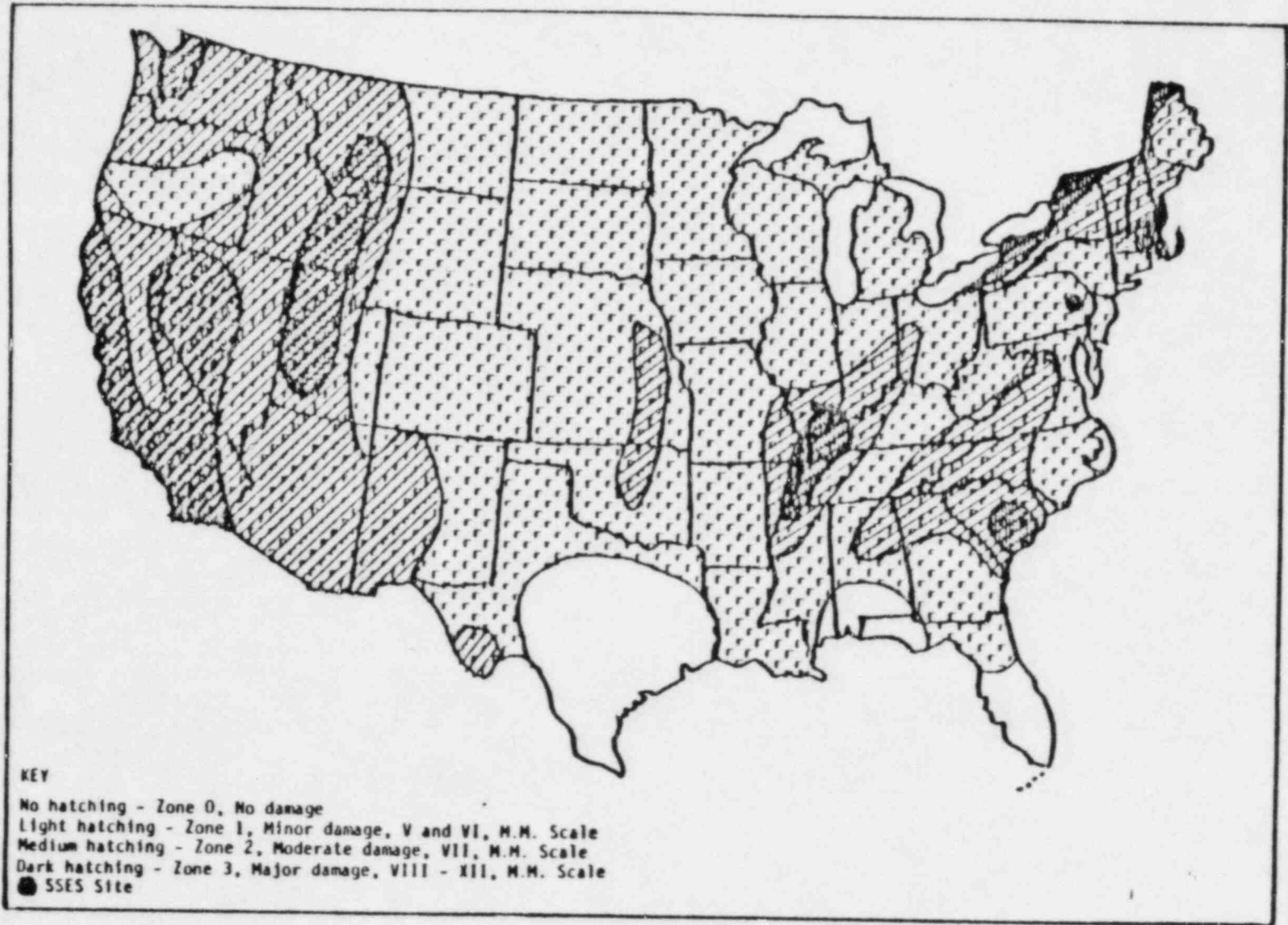
Elevations range from 496 ft msl at the river to 700 ft msl at the SSES location to over 900 ft msl in the northern section of the property.

4.4 Seismology

The SSES is located in Zone 1 (minor damage, intensity V-VI on the Modified Mercalli Scale) on the Seismic Risk Map of the United States⁹ as shown in Figure 4.3. Figure 4.4 shows the location, intensity and date of seismic activity within 60 miles of the SSES.¹⁰

4.5 Hydrology

The water table varies in depth below the surface from 7 to 26 feet in the vicinity (two mile radius) of the SSES and is generally of acceptable quality as is indicated by the 185 wells within the two mile radius.



Seismic Risk Map of the United States

Figure 4.3

Ground water movement at the site is toward the Susquehanna River at the rate of slightly over one foot per day.

The only significant surface water in the local area is the Susquehanna River. The characteristics of the river are described in detail in the SSES FES. It is repeated herein, however, that the highest recorded flooding level was well below (206 feet) the surface elevation of the SSES⁷.

4.6 Land Use

Land use near the SSES is predominantly rural in nature, i.e., farms, orchards and woods. There are, however, a number of small industries located within 5 miles of the site. The nearest industry is about 1.5 miles north-northeast.

Outdoor recreation facilities at the SSES includes a small lake for fishing and boating, nature trails and a picnicing area. Also a number of recreational facilities are near the site. PP&L maintains the Riverland's Park near the SSES. Within a 10-mile radius there is one county park, two Girl Scout camps and three privately owned camps. Recreational fishing is popular in the Susquehanna River along the east bank of the river near the site. The nearest boat launching facility is about 2 miles south of the site. No commercial fishing exists within 50 miles of the SSES.

The Susquehanna River has no commercial navigation; transportation routes are mainly by highway, railroad and air. Three Salem Township roads and U.S. Route 11 pass within 2600 feet of the center of the SSES exclusion area. The Delaware and Hudson Railroad line passes approximately 1.3 miles east of the station and the Conrail line is located about 1/2 mile east of the center of the site. The nearest operating airports are the Hazleton Municipal Airport and the Wilkes-Barre/Scranton Airport located 12 and 28 miles, respectively, from the station.

4.7 Meteorology

The local area weather has hot humid summers and cold winters with considerable amounts of snow. Freezing rain and glaze are not uncommon in the winter. Average temperatures range from 0°F in the winter to 72°F

during the summer. Temperatures below 0°F and above 90°F occur from four to seven times annually during the winter and summer, respectively. The annual average precipitation is about 35 inches and is fairly evenly distributed throughout the year. Thunderstorms occur, on the average, 31 days per year. Prevailing winds are from the west and west-southwest at an average speed of 4.5 miles per hour. Occasionally the prevailing wind is reversed but the west-southwest/east-northeast wind flow axis indicates the terrain has a major influence on the local airflow.

Thirty-five tornadoes have been reported during the period 1953 to 1974 in a 62 mile square containing the SSES. The calculated resultant tornado frequency and recurrence interval for a point in the site area is 4.6×10^{-4} , 7 tornadoes per year and 2,200 years, respectively.¹¹ Between 1871 and 1977, ten hurricanes passed within 50 miles of the SSES site.¹ The major danger from these disturbances is torrential rain and resultant flooding.

4.8 Socioeconomics/Historic, Archaeologic and Cultural Resources

These two environmental components have been described in the SSES FES, and no evidence has been found that indicates any significant changes have occurred in connection with them.

4.9 Background Radiation

The natural average Pennsylvania State background dose is 96.8 mrem/yr.¹² Due to the fact that SSES did not go to full power till November 16, 1982, there is insufficient data available to quantify its contribution to the local background radiation. In the absence of the aforementioned data and in order to provide a basis for subsequent calculations of the environmental effects of plant operation combined with the effects of the proposed action, the data from NUREG-0564 will be used as SSES's contribution to the background radiation.

5.0 ENVIRONMENTAL ASSESSMENT

5.1 Assessment of the Proposed Action

5.1.1 Construction

Construction activities associated with the LLRWHF resulted in some slight and temporary degradation of local air quality. Air pollutants generated from this activity primarily included: (1) fugitive dust particulate generation from grading and operation of the onsite concrete mixing batch plant (2) small amounts of particulates, hydrocarbons, nitrous oxide and carbon monoxide emissions from fossil-fueled construction vehicles and (3) small amounts of particulates from occasional burning of scrap wood. Dust from earthmoving was minimized by sprinkling and dust from the cement plant was minimized by the use of a baghouse filter. The small areal extent (approximately two acres) of the construction activity also eased dust control requirements. No land outside the previously industrialized and fenced SSES site was affected.

Personnel involved in the LLRWHF construction were drawn from the existing SSES work force so there were no socioeconomic consequences from the project.

The usual sources of noise associated with construction were present. However, these noise impacts were temporary, intermittent and were limited to the PP&L property.

At the time that the dry trash storage vault storage is built in the eastern half of the LLRWHF, the environmental impacts of that construction will be minimal due to its being carried out inside the metal building shell of the facility.

5.1.2 Radiological Assessment of the Proposed Action

There are three principal pathways by which members of the public may be exposed as a result of facility operation: direct radiation, exposure to radioactivity released in gaseous effluents and exposure to liquid effluents. These pathways, and the associated modes of exposure, are

illustrated in a generalized manner in Figure 5.1. This section provides an assessment of the radiological impact of the proposed operation via all important pathways. Both normal facility operation and unplanned radioactive releases are assessed, as are the expected incremental increases in occupational radiation exposures. For this assessment, the critical pathway is direct exposure.

The general assumptions used in these assessments are presented in Table 5.1. The isotopic composition was taken from reference 7. Additional assumptions and methods are presented below as they pertain to the subject under discussion. In each case, care has been taken to use assumed values which are conservative, yet realistic.

5.1.2.1 Direct Radiation

The primary exposure pathway associated with normal facility operation is direct irradiation of nearby residents and site workers as a result of waste loading and storage operations. Three separate components to this exposure are assessed:

- (1) Direct exposure to waste containers during their lifting and placement into the storage vaults;
- (2) Exposure to "skyshine" radiation (i.e., radiation which is emitted from the source in an upward direction and is subsequently scattered earthward) through the vault covers;
- (3) Exposure to direct radiation through the storage vault wall.

Skyshine doses have been calculated using the data of Roseberry and Shultis¹³ and American National Standard ANSI/ANS-6.6.1-1979¹⁴, while direct exposures were calculated assuming line or point source geometries. Table 5.2 presents the estimated annual dose that would result from waste placement and storage after four years (when storage, removal are in equilibrium) of operation. These values should be considered as upper level estimates since conservative assumptions were used. The maximum instantaneous exposure rate at the fence line is estimated to be about 1 mrem/hr, and the maximum in one hour is estimated to be a few tenths mrem (in one week less than 10 mrem).

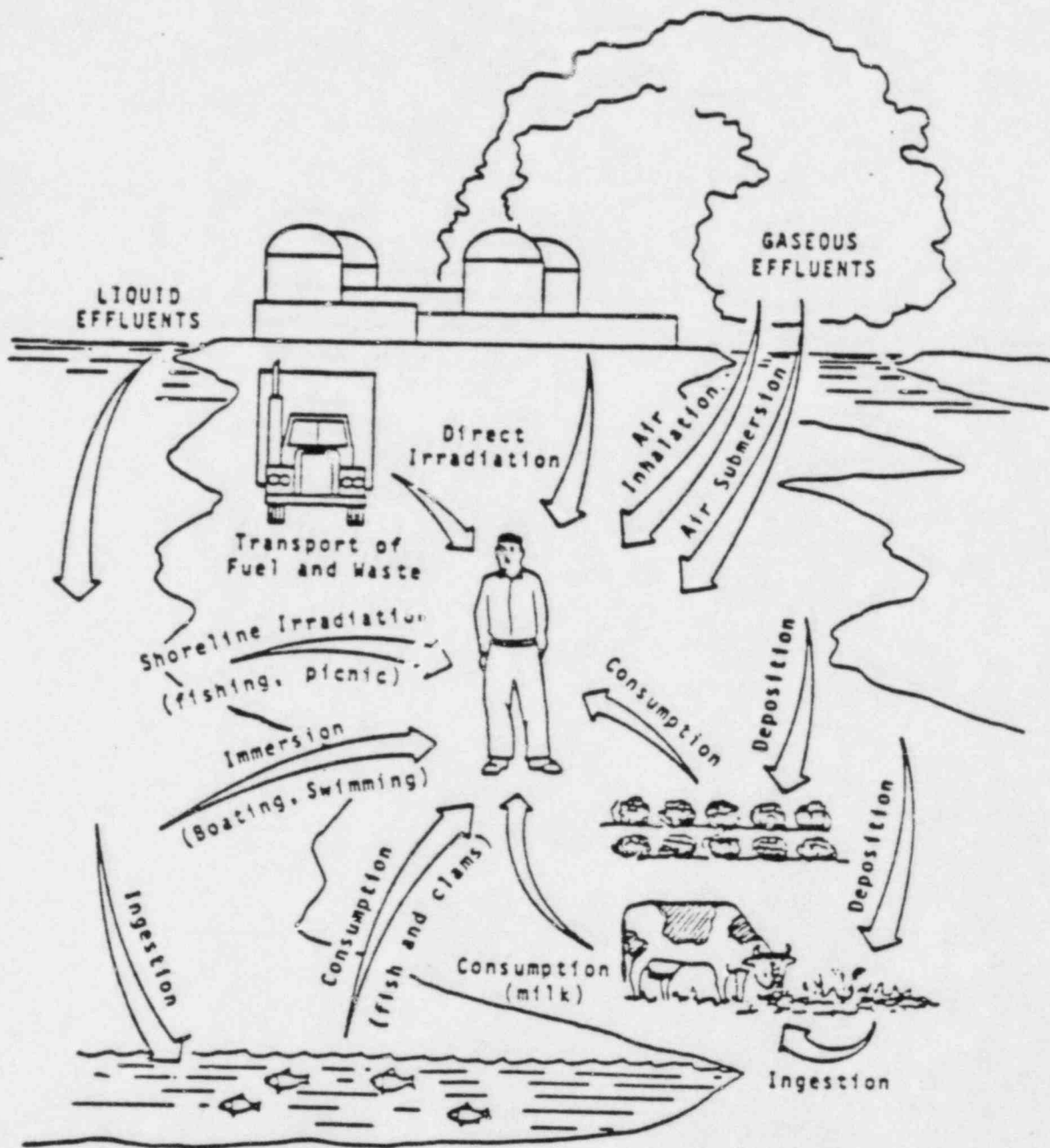


Figure 5.1. Generalized Radiation Exposure Pathways to Man.

Table 5.1 General Assumptions Underlying the Assessment of On-site Waste Storage

<u>Waste type</u>	<u>DAW</u> (1)	<u>CD</u> (1)	<u>RWCU</u> (1)
Containers stored per year	3200	222	38
Exposure Rate on contact R/hr	.03	3(2)	60(3)
Initial Activity per container (Ci)(4)	.0075	55	361
Activity stored per year (Ci)(4)	24	12,000	14,000

- (1) Containers assumed as 55 gallon, 153 ft³ and 83 ft³ for DAW, CD and RWCU waste, respectively.
- (2) With shield bell during placement the rate is 40 mR/hr
- (3) With shield bell during placement the rate is 110 mR/hr
- (4) Activity at t = 0, credit was taken for radioactive decay in assessment

Table 5.2 Estimated Annual Dose in mrem Resulting from Onsite Waste Storage

Location	Direct Exposure During Placement ¹	Skyshine Exposure	Direct Exposure through the wall	Total
75 ft. (Fence)	12	7.5	95	114
1300 ft. Nearest Resident	.1	0.2	0.8	1.1

1. Based upon 0.3 hr. required for placement of one resin liner into vault and at the closest point to the fence and nearest resident.

Table 5.3 Annual Population Dose Resulting From Onsite Waste Facility During Fifth Year of Operation.

Distance	Population	Exposure Rate (R/yr)	Person-Rem
0-5 miles	2,717	5.8E-6	1.6E-2
5-10	44,690	0.5E-6	2.2E-2

The NRC has established radiation protection requirements. The requirements, in 10 CFR 20, address among other aspects, occupational dose, exposure to concentrations of radionuclides in air and water, and permissible levels of radiation in unrestricted areas.

The Environmental Protection Agency (EPA) has established an annual dose equivalent limit of 25 mrem to the whole body, 75 mrem to the thyroid, and 25 mrem to any other organ for any member of the public from uranium fuel cycle operations. These limits are given in 40 CFR 190.

The estimated annual dose from waste placement and storage at a distance 1300 ft northwest of the facility (the location of the nearest resident) given in Table 5.2, is within the value of the EPA standard. The contribution from the onsite storage of waste is 4.4% of the standard. To compare the nearest resident dose to the 40 CFR 190 limits the contribution from all other fuel cycle activities in the area must be included. Whole body and organ doses for operation of the reactors at SSES site are taken from Table 4.9 of reference 1. The dose commitments to a maximum individual for operation of the SSES are 5.9 mrem whole body, 11 mrem skin, and 9.6 mrem to any organ other than the skin. Thus, when combined with the calculated doses from the waste holding activities, the total estimated annual dose is less than 50% of the 40 CFR 190 limits.

The dose to the population residing within ten miles of the LLRW facility resulting from four years operating time at the waste storage facility is presented in Table 5.3. As can be seen, the annual collective dose impact from waste storage activities is minimal, less than .01 percent of the dose due to naturally occurring background radiation.

5.1.2.2 Accidental Fire

The postulated accident, for assessment purposes, is a fire involving all of the stored DAW: 16,000 drums of trash waste containing a total of either the expected 9.9 or the estimated 17.4 Ci of activity. In trash or rubbish fires involving non-volatile radionuclides, entrainment of these nuclides would be roughly in proportion to the amount of fly ash produced. An upper limit to the production of fly ash from incinerator experience is estimated to be about 30 lb/T of refuse, or about 1.5 percent.¹⁵ If airflows are very

high (e.g., in forced draft situations), this percentage could increase substantially. However, such high airflows would not be expected in the case of a compartment fire, and 1.5 percent can appropriately be used as the maximum fraction of activity released.

This assessment is based on the following set of assumed conditions:

Activity released - 0.15 or 0.26 Ci in one hour
Atmospheric dispersion factor (from Ref. 7)
75 ft (23 m) - $3.7E-1 \text{ sec/m}^3$
1300 ft (400m) - $1.3E-3 \text{ sec/m}^3$
Breathing rate - $1.2 \text{ m}^3/\text{hr}$ for one hour
Dose conversion factors - from NUREG 0172 (Ref. 16).

These assumptions correspond to a hypothetical worst case accident. For example, for assessment it is assumed that an individual located at the fence line remains in the plume for an hour, a highly conservative assumption for estimation of the dose to an individual only 75 feet from the fire. Another conservative assumption is the involvement of the total DAW inventory in a fire. The involvement of the total inventory is extremely unlikely since the DAW is stored in noncombustible, steel containers within an area with a fire detection and suppression system.

The Environmental Protection Agency has established protective action guidelines for individuals exposed to radiation as the result of an accident. These guidelines are 1 rem to the whole body and 5 rem to the most severely affected organ. The 50-year dose commitments calculated for the postulated fire are presented in Table 5.4. As can be seen, these doses are well within the EPA guidelines at the location of the nearest resident. The doses are also within the limits of 10 CFR 100.

5.1.2.3 Occupational Doses

Waste handling operations associated with the LLRWHF will result in a small increase in the total occupational dose of the SSES workforce. The application of engineered safeguards and administrative controls will ensure that all exposures are maintained at levels which are as low as reasonably achievable (ALARA). Specifically, remote handling and lifting devices will

Table 5.4 Estimated Fifty-Year Dose Commitments From Activity Released in Accidental Fire

Location	Dose Commitment (mrem)		
	Total Body	Thyroid	Bone
17.4 Curies in storage			
75 ft	1,620	1,640	23,900
1300 ft (nearest resident)	5.7	5.8	84
9.9 Curies in storage			
75 ft	1,520	181	22,400
1300 ft (nearest resident)	5.3	.64	79

be monitored on closed-circuit television to further reduce employee exposures; a shield bell is used to shield the resin liners during movement from the transport vehicle to the storage vault; and procedures require the same type of safety practices as those being used at the reactor. All vehicles will be monitored for both contamination and dose rates before being allowed to return to the plant.

PP&L calculated the maximum expected occupational doses from the onsite storage of radioactive waste. These calculations were reviewed. Where sufficient detail was available to independently verify the calculations, the calculations were confirmed. The occupational dose to reactor plant workers was calculated assuming 2500 workers and no credit taken for shielding by the building. Table 5.5 summarizes the maximum expected annual collective occupational dose. The total annual 6.2 person-rem occupational dose from normal operations, the 1 to 2 person-rem exposure from construction of the trash storage vault and the 4.1 person-rem for transfer of the DAW to the storage vault are a very small part of the total occupational exposure expected at a BWR facility. For example, the 1979 average occupational exposure at a BWR is 733 person-rem per reactor¹⁷. In the staff's assessment of SSES operations, it is estimated that the annual occupational doses could average as much as 1600 person-rem¹⁸. Individual doses are controlled to be within the limits of 10 CFR 20.

5.1.3 Other Operational Impacts

The operation of the LLRW facility will slightly increase the transportation activities on the SSES site. Since approximately the same number of shipments of resin and trash waste will be made under the proposed action as would be made if all waste was transported off site, there would be essentially no change in the average frequency of travel on the SSES roads used during transfer from the radwaste building to the LLRWHF.

5.2 Evaluation of Options Beyond the Five-Year License Term

The options presented in subsections 3.1.1 and 3.1.2 are being evaluated to address environmental impacts that may be a result of the proposed action.

Table 5.5 Maximum Expected Annual Occupational Doses From Onsite Storage of Radioactive Waste

Category	Dose (person-rem/yr)
Truck Driver	0.6 ¹
Waste Handlers and Technicians	3.7 ¹
Reactor Plant Employees	1.9 ²
TOTAL	6.2

(1) Based on PP&L calculations.

(2) 2500 employees exposed, no credit taken for shielding by buildings.

5.2.1 Options at the End-of-License Term

To reiterate the options considered in subsection 3.1.1 are:

1. Renew license for continued operations until the eight reactor-year design capacity is used, or
2. Renew license for possession only; no new LLRW stored, or
3. Renew license for further operation; remove old LLRW and store newly generated LLRW, or
4. Ship the stored LLRW for disposal and terminate the license.

The environmental impacts associated with the first option will be the same as in connection with the proposed action. If, as expected, the LLRWHF is not full by the end of the five-year license term, it may be due to (1) less waste being generated, (2) the fact that for approximately two years of the license term there will be only one reactor in operation, or (3) the availability of offsite waste disposal services.

The second option would have less of an environmental impact than the proposed action for the following reasons:

- o There would be no opening of vault plugs.
- o There would be less occupational exposure.
- o The total activity of the stored containers would slowly decrease through the process of radioactive decay.

The third option would have the same environmental impacts as the proposed action. This option would be essentially a continuance of the mode of waste management described by the proposed action.

The fourth option would not involve any more occupational exposure than the

proposed action. It is assumed that this option would include LLRWHF decommissioning which is evaluated in the following subsection (5.2.2). This option, in the long term, would have far less environmental impact than the proposed action or the other three options.

5.2.2 Options at the End of Life-of-Plant

The options discussed in subsection 3.1.2 are repeated below.

1. Placing the LLRWHF in an inactive state (i.e., possession only with no planned operations) and providing for security and environmental monitoring for an indefinite time;
2. Sealing all radioactive material inside the LLRWHF (utilizing a material such as cement) in a technique known as entombment; and
3. Retrieving all radioactive waste and transporting it, to a disposal facility, then decontaminating as necessary, leaving the area in as close to its original state as possible.

The end of life-of-plant and the end of use of the LLRWHF may not, as has been previously mentioned, be coincidental, i.e., at any time that offsite waste disposal becomes assured the LLRWHF would no longer be used. At whatever time the facility clearly becomes no longer utilitarian some disposition of the structure will be necessary. At this time, PP&L has not addressed this eventuality, but the staff has suggested three reasonable options, enumerated above, for decommissioning the LLRWHF.

The first option permits continuing exposure, well within acceptable limits, but will require manpower and equipment to provide the necessary security and monitoring for a great many years.

The second option, entombment, would decrease the radiation permitted by option one, would remove the possibility of exposure by intrusion and obviate the necessity for monitoring. During the entombment process there could be the possibility of occupational exposure. This could be administratively controlled however. The amount of concrete that would be

required to effect entombment would be far greater than that required for construction of the facility.

If the third option were to be exercised, there could be, as with the second option, occupational exposure during retrieval of the waste containers and decontamination of the LLRWHF. As with the second option, this possibility could be administratively controlled. After decommissioning by means of this option, the facility would be available for unrestricted use.

5.3 Assessment of Alternatives to the Proposed Action

Since none of the alternatives were found to be viable in fulfilling PP&L's needs, no assessment of their environmental impacts is presented. However, because the impacts of the proposed action are small, it is anticipated that none of the alternatives, regardless of viability, would be found to be significantly environmentally preferable.

6.0 SUMMARY AND CONCLUSION

The action proposed by PP&L for the storage of SSES LLRW has been evaluated. Alternatives to the proposed action were also evaluated and found not to be viable because they fail to provide an immediate solution to reduce the uncertainty associated with the availability of disposal space for LLRW at near-surface disposal facilities and thereby provide PP&L with the capability for reliable and responsible management of LLRW generated at SSES. The proposed action provides PP&L with a means to responsibly manage SSES LLRW in the near term and does not foreclose options (of Pennsylvania, the region, PP&L or NRC) regarding the long-term management of SSES LLRW.

The proposed action involves two acres which is within the SSES site boundary. The land used at SSES had already been disturbed during construction of the nuclear plants and possible societal impacts were considered at that time.

The LLRW Holding Facility is designed so that operations will be conducted in accordance with all applicable regulations concerning radiation protection of the general public and work force. Furthermore, activities involving radiation exposures will be subject to the PP&L SSES ALARA program. The occupational doses associated with the proposed action are small, on the order of 1 percent or less of the annual average occupational exposure at a BWR, and within the limits of 10 CFR Part 20. Also when combined with the doses from the SSES, the dose to the nearest resident is within the requirements of 10 CFR Part 190.

In regard to compatibility with waste management policies, PP&L options, and possible future NRC licensing actions for the SSES, the proposed action has no significant impacts. The proposed action is compatible with the development of a regional low-level waste management compact. The proposed action would simply fill a gap until a Northeastern States Low-Level Radioactive Waste Management Compact is formed and assures capacity for the disposal of the wastes while providing LLRW management flexibility. The proposed action does not not irrevocably commit PP&L to any one option for the long-term management of SSES waste. Other options may require a license action by the NRC. The proposed action does not force, nor does it preclude, any future NRC licensing action.

Given the present status concerning the formation of waste management compacts, particularly in regard to the Northeastern Region including the State of Pennsylvania, the staff feels that there will likely be adequate space available for offsite waste disposal by the end of the initial license term, or soon thereafter. The Northeastern states, including Pennsylvania, are actively pursuing the formation of a regional compact for the management of low-level radioactive wastes.³ Preliminary plans for formation of such a compact have been presented to the involved states' legislative bodies as of January of 1983.¹⁹ Should space for disposal not be available for the stored LLRW at the end of the license term, continued storage can be accomplished in an environmentally acceptable manner, for no expected conditions are known that would cause degradation of container integrity that could not be identified in a timely manner by the container monitoring programs. Should preventive actions be necessary, PP&L has the capability to repackage the LLRW at the SSES.

Lastly, the proposed action would serve an immediate useful function. It provides PP&L an environmentally acceptable alternative to shutting down the SSES if space is not available for disposal of LLRW from the facility.

On the basis of this Environmental Impact Appraisal, the Staff concludes that the proposed action will not significantly affect the quality of the human environment and that there will be no significant environmental impact from the proposed action. Therefore, the staff has found that an environmental impact statement need not be prepared, and that pursuant to 10 CFR 51.5(c) the issuance of a negative declaration to this effect would be appropriate.

7.0 REFERENCES

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18. "Safety Evaluation Report-Susquehanna Units 1 and 2," NUREG-0776, April 1981.
19. Meeting 30 November, 1981 and telephone conversation 21 October, 1982 with Mr. William Dornsife of the Pennsylvania State Bureau of Radiological Health.



UNITED STATES
NUCLEAR REGULATORY COMMISSION
WASHINGTON, D. C. 20555

February 11, 1983

WM: 202

ATTENTION: Commission Licensees

SUBJECT: FINAL RULEMAKING ON LAND DISPOSAL OF LOW-LEVEL RADIOACTIVE WASTE

The new final NRC regulation governing disposal of low-level radioactive waste (10 CFR Part 61) was published in the Federal Register on December 27, 1982. A copy of Part 61 is enclosed. As a licensee, you may have occasion to transfer low-level wastes intended for disposal at land disposal facilities. Although Part 61 applies primarily to disposal site operators, it does include provisions that pertain to persons who generate waste disposed at land disposal facilities. The new provisions include classifying wastes, preparing manifests, investigating missing shipments, and recordkeeping. Enclosure 2 is a question and answer fact sheet prepared specifically to help you to better understand the rule and help you to determine when and how it applies to you. Should you need further information, Enclosure 2 contains a list of telephone contacts.

Edward F. Hawkins
Edward F. Hawkins, Acting Chief
Low-Level Waste Licensing Branch
Division of Waste Management

Enclosures:

1. FR Notice dtd 12/27/82
2. Generator Fact Sheet

FACT SHEET
NRC Waste Generator Licensee
10 CFR Part 61

1. Q: What are low-level wastes?

A: Low-level wastes are generally defined in § 61.2 of Part 61 as radioactive wastes containing source, special nuclear, or byproduct material that are not classified as high-level radioactive waste, transuranic waste, spent nuclear fuel, or uranium or thorium tailings and waste.

2. Q: Under what circumstances do these new rules apply to transfers of low-level radioactive waste?

A: The new rules apply when radioactive waste (a) is transferred to another person and (b) will be disposed of at a licensed land disposal facility. They apply even when wastes are transferred to an intermediate licensed waste collector or waste processor. They apply to all transfers of radioactive waste by NRC licensees if both (a) and (b) are met.

3. Q: If I transfer a source back to the manufacturer, do I have to meet the requirements in § 20.311?

A: No. However, if the manufacturer subsequently disposes of the source, he would need to meet the requirements in § 20.311.

4. Q: What provisions apply to NRC licensees generating waste?

A: 10 CFR §20.311 Transfer for disposal and manifests
10 CFR §61.55 Waste classification
10 CFR §61.56 Waste characteristics
10 CFR §61.57 Labeling

5. Q: When must NRC licensees transferring wastes intended for disposal at a land disposal facility begin complying with the rule?

A: December 27, 1983.

6. Q: What additional guidance is available to licensees?

A: NRC Technical Positions on Waste Classification and on Waste Form. Copies will be distributed to licensees. Copies will be available from the Low Level Waste Licensing Branch, USNRC, Washington, DC 20555. Technical Positions are staff guidance documents that may be used until regulatory guides are published.

7. Q: Does the new rule require submittal of an application for a license amendment?
- A: No. However, technical specifications and procedures should be checked for potential conflicts. Also, licensees should plan to address compliance with the new requirements in your next application for license renewal, particularly if you generate wastes which must meet the stability requirements of § 61.56, i.e., Class B or Class C waste. The technical positions mentioned in question 6 contain guidance which may be helpful.
8. Q: Can host States require permits for use of disposal sites?
- A: Yes.
9. Q: Can waste collectors or disposal site operators impose administrative requirements to facilitate their activities?
- A: Yes. The operator's or collector's license may also have site or company specific conditions. Licensees should continue to determine and comply with their specific requirements.
10. Q: What type of requirements are included in the new § 20.311 of 10 CFR Part 20?
- A: Classifying waste, meeting the waste form requirements, marking wastes, preparation of manifests, transfer and retention of manifests, investigating missing shipments, quality control programs, and recordkeeping.
11. Q: How is waste classified in Part 61?
- A: Part 61 establishes three classes of wastes based on radiological hazard: Class A, B, and C. Class A waste contains the lowest concentrations of radionuclides and must meet only minimum waste form requirements. Class B and C wastes contain higher concentrations and must meet both the minimum and stability waste form requirements. Class C wastes must be disposed of by the site operator using methods that provide additional protection against inadvertent intrusion.
12. Q: Is there any relationship between Department of Transportation (DOT) Type A and B quantities and Part 61 classes A, B, and C?
- A: No. The requirements associated with Class A, B, or C do not have any relationship to DOT requirements and do not alter any DOT requirements.
13. Q: Can licensees use DOT shipping papers or disposal site Radioactive Shipping Records as manifests?
- A: Yes, as long as they contain the required information.

14. Q: Where are the manifest information requirements listed?
A: Paragraphs 20.311(b) and (c).
15. Q: What is the objective of the quality control program?
A: To demonstrate compliance with waste classification and waste form requirements. The technical positions referenced in question 6 address acceptable methods for demonstrating compliance.
16. Q: How complex must a quality control program be?
A: The nature of the program should reflect the complexity of the waste. There are no minimum requirements.
17. Q: May licensees average nuclide concentrations?
A: Yes. Averaging is permitted over the mass or volume that will be disposed of. Licensees may average over the volume or mass of waste prior to packaging (e.g., the concentration determined by averaging activity over a dumpster of soil that is subsequently put into several 55 gallon drums may be used as the concentration for each of the drums). Licensees may average over the volume or mass of the waste form (e.g., the activity of a source embedded in a drum of cement may be averaged over the volume of the cement).
18. Q: If I use a reusable shielded cask for transporting wastes, can I average over the volume or mass of the cask since it is the "Transportation Package"?
A: No. For the purpose of classifying wastes, averaging should be performed over the volume of the waste form which is being disposed of. In addition, when several drums are shipped within a reusable shielded cask, each drum should be marked so that the site operator can distinguish the classification of the individual waste containers.
19. Q: How do licensees classify wastes which do not contain any of the radionuclides listed in Tables 1 and 2 of § 61.55, such as depleted uranium?
A: Such waste is Class A.
20. Q: How do licensees deal with materials such as discrete Ra-226 sources or accelerator produced isotopes which the Commission doesn't regulate?
A: Licensees should check with the site operators for requirements on these materials. Question 19 does not cover these materials.

21. Q: What do licensees do if the concentrations in the waste exceed Class C limits and the waste is not acceptable for routine near surface disposal?
- A: Licensees must safely store the waste until they determine from a specific site operator whether the specific waste can be disposed of at that site. The site operator may have to apply for specific approval and the generator may have to provide additional information on the waste to the operator.
22. Q: Under § 20.311, who is responsible for determining that waste shipments reach their destination?
- A: The shipper. The shipper may be the generator, waste collector, or processor.
23. Q: When must the shipper investigate late or missing shipments?
- A: If receipt of the waste is not acknowledged within 20 days after transfer.
24. Q: What types of reports are involved?
- A: The only reports required are those describing the investigation of lost shipments.
25. Q: What types of records are required?
- A: Licensees must keep manifests and acknowledgement of receipt of wastes to meet existing recordkeeping requirements in Parts 30, 40, and 70 on transfers of licensed material. Licensees should also maintain documentation on their quality control program to show inspectors that a program exists, that the program is adequate to make the certifications on waste classification and form required, and that management evaluation is included.
26. Q: Why do subsections 20.311(d), (e), (f) and (g) seem repetitious?
- A: These subsections are written to spell out the specific requirements for each of four categories of licensees. Waste generator requirements are in (d); prepackaged waste collector requirements are in (e); waste processor requirements are in (f); and disposal site operator requirements are in (g).

27. Q: Who can I contact for more information?

A: General questions: Paul Lohaus (301)42-74500
Kitty Dragonette (301)42-74160
Regional Office Staff (see Appendix D 10 CFR
Part 20 for your region):
Region I (215)337-5000
John Kinneman or John Glenn
Region II (404)221-4503
John Potter
Region III (312)932-2500
Charles Peck or Robert Greger
Region IV (817)860-8100
Richard Bangart
Region V (415)943-3700
Herb Book

Quality control program questions: Timothy Johnson (301)42-74697
(reactors)
Kenneth Jackson (301)42-74055
(nonreactor licensees)

NUCLEAR REGULATORY COMMISSION

10 CFR Parts 2, 19, 20, 21, 30, 40, 51, 61, 70, 73 and 170

Licensing Requirements for Land Disposal of Radioactive Waste

AGENCY: Nuclear Regulatory Commission.

ACTION: Final rule.

SUMMARY: The Nuclear Regulatory Commission (NRC) is issuing regulations that set out licensing procedures, performance objectives and technical requirements for the licensing of facilities for the land disposal of low-level radioactive waste. The regulation is necessary to provide comprehensive national criteria applicable to the land disposal of radioactive waste. This action is taken in response to the needs and requests of the public, Congress, industry, the states, the Commission, and other Federal agencies for codified regulations to govern the disposal of low-level radioactive waste.

DATES: 10 CFR 20.311 of Part 20 effective date is December 27, 1983; 10 CFR Part 61 and all other changes effective January 29, 1983.

ADDRESSES: Documents referred to in this regulation may be examined at the Commission's Public Document Room, 1717 H Street NW., Washington, DC. Copies of NUREG's may be obtained by writing the Superintendent of Documents, U.S. Government Printing Office, CIB, SSOS, UCP, Washington, DC 20401 or the NRC/GPO Sales Program, U.S. Nuclear Regulatory Commission, Washington, DC 20555. Copies of Branch Technical Positions may be obtained from the Low Level Waste Licensing Branch, U.S. Nuclear Regulatory Commission, Washington, DC 20555.

FOR FURTHER INFORMATION CONTACT: Paul H. Lohaus, Low-Level Waste Licensing Branch, Division of Waste Management, Office of Nuclear Material Safety and Safeguards, U.S. Nuclear Regulatory Commission, Washington, DC 20555, telephone (301)427-4500.

SUPPLEMENTARY INFORMATION:**Introduction**

The NRC is amending its regulations to provide specific requirements for licensing the land disposal of low level radioactive wastes containing source, special nuclear, or byproduct material. The amendments provide licensing procedures, performance objectives, and technical criteria for licensing facilities for the land disposal of radioactive waste. Specifically, the regulations

establish performance objectives for land disposal of waste; technical requirements for the siting, design, operations, and closure activities for a near-surface disposal facility; technical requirements concerning the waste form that waste generators must meet for the land disposal of waste; classification of waste; institutional requirements; and administrative and procedural requirements for licensing a disposal facility. Amendments to other parts are established to govern the certification and use of shipping manifests to track waste shipments and clarify, but not substantially modify, the requirements of existing regulations. Provisions for consultation and participation in license reviews by State governments and Indian tribes are also included. Specific requirements for licensing facilities for the disposal of radioactive wastes other than high level waste by alternative land disposal methods will be proposed in subsequent rulemakings. Disposal of radioactive wastes by an individual licensee will continue to be governed by 10 CFR Part 20.

Background

On October 25, 1978, the Commission published an Advance Notice of Proposed Rulemaking (43 FR 49811) regarding the development of specific regulations for the disposal of low-level radioactive wastes (LLW). The development of these regulations was in response to needs and requests expressed by the public, the Congress, industry, the States, the Commission, and other Federal agencies for codification of regulations for the disposal of LLW. The respondents to the advance notice strongly supported the Commission's development of specific criteria and standards for the disposal of low-level waste. The comments received by the Commission on the advance notice were used by the Commission in scoping the form and content of the draft Environmental Impact Statement (EIS) (NUREG-0782) and the regulation.

On February 28, 1980, the Commission also published a Notice of Availability of a preliminary draft regulation, dated November 5, 1979, announcing availability of the draft for public review and comment (45 FR 13104). This was done to help ensure wide distribution and early public review and comment on the development of the rule. Copies of this draft regulation were distributed to all of the States.

During the summer and fall of 1980, the Commission also sponsored four regional workshops to provide an opportunity for open dialogue among representatives of the States, public interest groups, industry, and others on

the issues to be addressed in the Part 61 rulemaking. These workshops were particularly useful in formulating our positions on the more judgmental aspects of the rule and underlying assumptions (such as the length of time we should assume that active governmental controls could reasonably be relied on).

Proposed 10 CFR Part 61 and conforming amendments were published on July 24, 1981 (46 FR 38081). The original comment period was due to expire October 22, 1981, but was extended to January 14, 1982 to coincide with the 90-day comment period for the supporting draft EIS (NUREG-0782). The availability of the draft EIS was announced on October 22, 1981 (46 FR 51776). The proposed rule was sent to all Commission licensees and copies were provided to Agreement State officials to distribute to their licensees.

Public comments were received on both the rule and draft EIS and may be examined at the Commission's Public Document Room (PDR) located at 1717 H Street NW., Washington, D.C. Comments on the rule are available at the PDR Docket No. PR-2 *et al.* (46 FR 38081). Comments on the draft EIS are available at the PDR referencing Docket No. PR-61 (46 FR 51776).

A total of 42 persons commented on the draft EIS. These commenters represented a variety of interests. Comments were received from 21 States, 8 industry/utilities, 8 Federal agencies/laboratories, 3 individuals and 2 broker/disposal firms. The comments generally raised or echoed the same issues raised concerning the rule except that some questions on the methodologies and presentation of results were raised. A detailed analysis of the comments on the draft EIS will be included as an appendix to the final EIS (NUREG-0945), which is being prepared¹

Overview of Comments on 10 CFR Part 61

A total of 107 different persons submitted comments on the proposed 10 CFR Part 61. The commenters represented a variety in interests. Comments were received from: 19 industrial groups, 17 state groups, 15 individuals, 13 utilities, 9 federal agencies or laboratories, 8 universities, 4 medical groups, 4 engineering firms, 4 public interest groups, 4 professional organizations, 3 broker/disposal firms, 2

¹ Copies of this report may be obtained by written request to the Division of Technical Information and Document Control, Washington, D.C. 20555. Copies will also be made available for inspection or copying for a fee at the NRC Public Document Room, 1717 H Street NW., Washington, D.C.

legal groups, 2 surety groups, and 5 others. Commenters offered from one to over 20 comments each. The topics addressed a wide range of issues and all parts of the rule.

The general response was quite favorable. Almost half (47) expressed explicit support of the rule or overall approach. Many of these commenters expressed some concern about one or a few specific provisions and most offered suggestions for improvements. Many expressed the view that the rule provides a needed and adequate framework for establishing additional low-level waste disposal capacity. The importance, reasonableness, and clarity of the rule were noted. Support was expressed by almost every sector.

Only 15 commenters expressed any outright opposition to the rule or some significant portion of the rule. Most were individuals. No state group or current disposal site operator expressed opposition. The opposition expressed appeared to stem from objections to nuclear power and use of radioactive materials, opposition to shallow land burial as a disposal method in general and for TRU wastes in particular, opposition to perceived increase in costs to waste generators, the regulatory burden of the licensing process, and the technical requirements in Subpart D of the proposed rule. Several of the commenters that expressed opposition offered suggestions for improving the rule, however.

Most of the remaining commenters (45) offered constructive comments without taking a general position on the rule, or offered support with reservations about one or more aspects of the rule.

All concerns expressed by all commenters are discussed in detail in a staff analysis of comments which is available in the PDR. Because the volume of comments and analysis in detail occupy several hundred pages, the following discussion summarizes and responds to all comments of major and generic significance. For example, comments on Part 61 standard provisions that are common to all Commission regulations are not discussed in this summary, but are covered in the document available in the PDR.

Summary of Comments for Proposed Part 61

Subpart A: General Provisions. A variety of comments were received that related to the scope of the rule. Two clarifying changes were made to make it clearer that uranium and thorium tailings as defined in Section 11e(2) of the Atomic Energy Act of 1954, as

amended, are not subject to the requirements of Part 61, but are disposed of according to requirements in 10 CFR Part 40. In addition, clarifying changes were made to state that the requirements of Part 61 do not apply to persons who are licensed by an Agreement State pursuant to authority relinquished to that State by the Commission in accordance with Section 274 of the Atomic Energy Act of 1954, as amended.

Some commenters felt that provisions should be made for an individual to dispose of his or her own waste. Private waste disposal may be licensed under current provisions of 10 CFR Part 20. The Commission feels that these provisions are adequate and that no change to Part 61 to accommodate private disposal is warranted.

At least two State commenters asked about Agreement State requirements being compatible with Part 61. The Commission is preparing guidance for States that will consider Section 61.2, Definitions; Subpart C, Performance Objectives; Subpart D, Technical Requirements for Land Disposal Facilities; those portions of Subpart B that are necessary to implement the provisions of Subparts C and D; Section 20.311, Transfer for disposal and manifests; and that portion of Subpart E requiring closure funding arrangements as a matter of compatibility for the Agreement States. Guidance will identify those aspects where uniformity is desirable and those aspects where States would have flexibility in establishing their own requirements.

It was suggested that construction of a disposal facility should be permitted to begin before a license is issued. The Commission believes that to do so would have a detrimental effect on the decisionmaking process and therefore no change is being made to this provision.

In the proposed rule, near surface disposal was defined in § 61.2 and discussed in § 61.7 as disposal in the upper 15-20 meters of the earth's surface. Based on comments received, the wording could be misinterpreted to mean that disposal was allowed only between 15 and 20 meters or that deeper disposal was prohibited. The wording was clarified to make it consistent with the waste classification requirements. (Class A and B wastes have no minimum depth requirement and Class C wastes have a 5 meter depth requirement when relying on depth alone.) Disposal at a depth greater than 5 meters would also be acceptable.

Subpart B: Licenses. Comments received on Subpart B covered a wide range of issues. Many were concerned

with clarification and intent. There were, however, several issues that were more substantive and addressed by a large group of commenters.

Several commenters were concerned that the language in several places required the applicant to demonstrate in the application that certain objectives were met. Their concerns were over what would constitute a demonstration, and the impossibility of meeting an objective with complete certainty as implied by the language in the rule. The Commission agrees with these commenters and changes have been made in appropriate places to indicate that what the Commission wants is information or analyses that will provide reasonable assurance that the objective or requirement will be met. Other minor changes were made for purposes of clarification.

An advisory statement in § 61.13 that the ground water pathway was generally the most significant for near surface disposal, in terms of releases of radioactivity, was deleted. This section requires an analysis of all potential pathways and two commenters objected to singling out ground water.

Several commenters expressed concern over the length of time that the licensing process might take and suggested limits be established in the regulations. The Commission does not believe that this is practicable, considering the uncertainties in predicting the quality of future applications, the availability of staff resources at critical times, and the potential for hearings. The licensing process must be in accordance with the Commission's mission to protect public health and safety but the Commission does agree that the licensing process must be carried out in the minimum amount of time consistent with this mission. Some changes in the procedural aspects of the rule are being made with this in mind (see comments, Subpart F). The Commission staff is developing technical positions to assist applicants in preparing their applications and is developing performance assessment capabilities that will enable the staff to perform timely reviews.

Nine commenters addressed the language in § 61.25 that prevents the licensee from making any changes in the facility or procedures described in the application except as provided for in specific license conditions. The commenters felt that this was unnecessarily restrictive, in that there may be aspects of the facility or procedures that were described in the application, but which are not important to public health and safety and the

licensee should be free to change them. The Commission agrees, since it was not intended that all changes be subject to Commission review or approval, only those important to public health and safety. Section 61.25 is changed accordingly.

Over a dozen commenters raised objections to the requirement that the license be renewed on the usual five-year interval with a concomitant public notice on the opportunity to request a public hearing. The dominant reason for these objections is the burden that is perceived if public hearings were held every five years at the time of license renewal. The Commission believes that a periodic reassessment by the licensee and the Commission staff is necessary. This reassessment should factor in the past operating experiences of the disposal facility, the results of monitoring data, changing economic conditions that might affect financial assurances, advances in technology, etc. While there are alternatives to license renewal in order to ensure these periodic reappraisals, the Commission has found through its experience that periodic license renewal is the most effective method. As for the public notice of the renewal and the notice of opportunity to request a public hearing, the Commission agrees that this is not necessary and it has been deleted. Deleting this requirement will not have an adverse effect on the public's interest and rights. According to revised § 61.25, any changes to the license conditions from a license renewal process would be subject to notice and opportunity to request hearings if the conditions were in the highest category specified in that section (paragraph 61.25(a)(1)).

Two commenters suggested not subjecting the licensee to an opportunity for hearings at the time of site closure. The Commission believes that this is an important and worthwhile time to provide for public participation. No changes were made.

While none of the commenters took exception with the need for a period of post-closure observation and maintenance by the licensee, a number did object to the open-endedness of the requirements that this period be for "a minimum of five years." This provision has been changed to state that the period will normally be five years, but that shorter or longer periods may be approved by the Commission in connection with the approval of the site closure plan for a specific site.

Several commenters, including Chem-Nuclear Systems, Inc., and U.S. Ecology, the operators of the existing disposal facilities, were concerned about possible delays in transfer of the license

to the site owner at the end of the post-closure observation period. They foresee the possibility of more stringent requirements being imposed at this time, thereby delaying the transfer with an adverse effect on the ability of the licensee to effect proper closure due to changes beyond the financial requirements initially established. The Commission recognizes this possibility, but it is beyond the Commission's authority to control or regulate the site owner and force the transfer to take place. Any requirements for transfer that are outside the public health and safety considerations prescribed by Part 61 became a matter of contract or agreement between the site owner and the site operator. With the Low Level Radioactive Waste Policy Act laying the responsibility for disposal of low level waste on the States, it is obvious that the States will play an increasingly important role. State authorities, who in all likelihood will be the site owners, should become active participants in the disposal activities from the earliest stages of development through site closure and stabilization so that at the time of site transfer to them for institutional control, there are no unforeseen obstacles to the orderly and timely transfer. Part 61 provides for this participation in the licensing process, and as landlord, there are other avenues of participation.

Subpart C: Performance Objectives. A dozen commenters addressed the approach taken in Part 61 to establish performance objectives supplemented by some minimum technical requirements. All commenters except three supported the approach of addressing disposal from an overall systems standpoint, i.e., establishing overall performance objectives and minimum technical requirements and leaving considerable flexibility on how an applicant or licensee would design and operate a site. Of the three who disagreed, one felt that the concern for public health and safety is so great that the rule should be based on prescriptive requirements; one felt that there should be no technical requirements in the rule, only performance objectives; and the third felt that the rule is restrictive by establishing both performance objectives and technical requirements. On balance, the comments were judged to be supportive of the mix of objectives and requirements and no changes have been made in this regard.

One commenter challenged the performance objectives in Part 61 as being premature in advance of relevant EPA standards and beyond the agency's authority to the extent that they are not already embodied in 10 CFR Part 20 and

that they are unduly stringent and unsupported. With respect to this comment, EPA, under its ambient environmental standards setting authority assigned by Reorganization Plan No. 3 of 1970 has the authority to prepare a standard that will set limits for releases of radioactivity to the general environment from disposal facilities. Presently there is no such EPA standard. In the absence of such a standard, the Commission examined a range of limits which bound that expected for the EPA standard and selected a proposed performance objective that establishes a release limit for the site boundary, a regulatory action within the limits of NRC authority. In a rulemaking action, the Commission is not solely limited to existing standards in Part 20 and the Commission does not intend to withdraw any portion of the rule that may be related to the performance objectives.

With regard to the specific performance objective for releases to the environment, the Environmental Protection Agency commented that the establishment of an individual exposure limit at the site boundary for releases as proposed in § 61.41 is appropriate. They stated that the range of 1 to 25 mrem/yr analyzed by the Commission was a reasonable range that should encompass any standard which EPA might derive for low level waste disposal facilities. Based on the Commission's analysis, NRC does not anticipate any need to change the technical requirements of Part 61 to meet a future EPA standard. In their comments, EPA stated their opinion that it was inappropriate to apply the EPA drinking water standard as proposed in § 61.41. Accordingly, this part of the performance objective has been deleted. However, this does not diminish the Commission's concern over protecting sources of drinking water. The Commission will assess the potential impact on drinking water supplies as part of its licensing review.

Reaction to the proposed performance objective to protect potential inadvertent intruders was mixed. There were some who felt the proposed 500 mrem whole body dose to the intruder was too high, some felt that it was the right value for a standard, and others felt that higher values were in order. Those that felt that the standard should be higher suggested values of 5 rem or 25 rem (the Department of Energy) to correspond to limits for occupational exposure or one-time exposures to workers from potential accidents. A number of commenters, in their comments about considering the

probability that intrusion will occur, expressed concern about weighting too heavily the protection against inadvertent intrusion in determining disposal requirements for waste. Based on these comments, the Commission believes that the primary concern of those who feel that the intruder protection objective is too restrictive is the effect that this has on the concentrations of certain nuclides that are acceptable for disposal in a near surface facility and the need to meet additional requirements such as stability for some wastes. With this in mind, and in response to other comments, the Commission has reevaluated the calculations that establish the waste classification concentration limits to eliminate unnecessarily conservative assumptions with the result that the analysis is more realistic and the limits for several important isotopes have been raised. With this action, the Commission believes that most of the concerns of those who encouraged higher exposure limits or less emphasis on protection of intruders will have been met.

With respect to those who suggested that lower limits would be appropriate, there were no compelling arguments or technical demonstrations presented that persuaded the Commission to lower the dose limit for intruders.

The EPA recommended that the 500 mrem dose limit be deleted from the performance objective, since the licensee would not be able to monitor or demonstrate compliance with a specific dose limit that applies to an event that might occur hundreds of years from now. They did recommend use of the 500 mrem whole body dose limit coupled with ALARA as the basis for determining the concentration limits in Table 1 of Part 61. The 500 mrem dose limit has been deleted from the performance objective but retained as the basis of the waste classification limits.

Comments were offered that more emphasis should be placed on requirements, such as the use of durable monuments to warn potential intruders. This concept is incorporated in the regulation.

Acts of terrorism and sabotage were identified as possible intrusion problems and suggestions were made for protecting against such acts. The Commission does not feel that the likelihood of such events or the magnitude of the effects of such acts are sufficient to warrant requirements in this regard.

EPA asked for a clarification of the intent of the performance objective in § 61.43 as it pertains to effluents from the site. This performance objective

states that operations at the land disposal facility must be conducted in compliance with the standards for radiation protection set out in Part 20. Part 20 contains standards for concentrations of radioisotopes in air and water released from a licensed facility. Section 61.41 sets forth limits on concentrations of radioisotopes released from a land disposal facility which are lower than those in Part 20. It is the Commission's intent that the provisions of Part 20 will apply to all aspects of radiation protection during operation except for releases of radioactivity from the site which will be governed by the more stringent requirements of § 61.41. The rule has been modified to clarify this point.

Commenters pointed out a need to be clearer in the rule on how the principle of maintaining radiation exposures to a level that is as low as reasonably achievable (ALARA) will be handled. The Commission intends that the ALARA principle apply to the performance objectives for long-term environmental release and protection of individuals during site operations. It cannot apply to the intruder performance objective, since Part 61 sets out the requirements for protection and intrusion which is beyond the disposal facility licensee's control. Appropriate changes have been made in §§ 61.41 and 61.43 to reflect the ALARA principle.

Subpart D: § 61.50, Disposal Site Suitability for Near-Surface Disposal. Approximately two dozen commenters offered comments on various aspects of § 61.50, addressing disposal site suitability requirements. These comments address eight subject areas which are discussed below.

Eight comments were received on the requirement that the disposal site shall be capable of being characterized, modeled, analyzed, and monitored. The comments were directed to the perceived vagueness of the requirement, i.e., what does it mean to be capable of being characterized, modeled, analyzed, and monitored? Some commenters offered suggested rewording or examples. The Commission has issued a staff technical position (NUREG-0902) that provides interpretation and explanation of the meaning and intent of this requirement. In the technical position, it is explained that the site characteristics must be such that limited site characterization can adequately define the site characteristics spatially across the disposal site and that site characteristics should vary with a sufficiently narrow range so that the input to modeling is representative of the hydrogeologic units and the assumptions underlying the modeling

are valid. Further, natural processes affecting the disposal site should be occurring at a consistent and definable rate such that the modeling of the site will represent both present and anticipatable site conditions after closure. Finally, site characteristics must be such that a reasonable number of monitoring points can adequately describe the extent to which radionuclides have migrated from the waste disposal units. In addition, the Commission's staff is developing an in-house modeling capability and will share that capability through pre-qualification of prospective computer codes. The Commission believes that a concise statement in the rule along with guidance on these subjects provided by technical position papers and Regulatory Guides is appropriate.

Several aspects related to ground water were addressed in the comments. Three commenters (Ontario Hydro, the Department of Interior, and the Department of Energy) endorsed the provision in § 61.50(a)(7) that permits disposal below the water table where diffusion dominated the ground water flow system.

The Department of Interior recommended using the term, "molecular diffusion" and both they and Ontario Hydro suggested specifying a limit for soil hydraulic conductivity of less than 10^{-6} cm/sec, as appropriate. There were several commenters who disagreed with this provision and recommended total containment or some minimum depth to the water table.

The Commission envisions a site that would satisfy the exception in section 61.50(a)(7) as one with an inactive flow system so that the water which would contact the wastes would move on the order of less than one foot per year. Given the low hydraulic conductivity and effective porosity of the soils, very little water would actually contact the waste or flow from the disposal units. The travel time will result in sufficient reduction of concentration of the small amounts released and fine-grained soils will typically provide significant attenuation for most radionuclides. No change has been made to this provision of the rule.

Several commenters suggested requirements on retardation properties for soils, both impervious and porous. One suggested a leachate collection and treatment system for the impervious soils. The Commission does not consider it appropriate to set forth specific values for characteristics which promote attenuation of radionuclides. Whereas attenuation is advantageous for some radionuclides, others such as H-3, C-14,

and I-129 may not be significantly attenuated. The Commission believes that reliance should be placed on siting requirements which will keep water away from wastes, result in low volumes of contaminated water being released, and provide a long travel time for decay. The Commission takes exception to any design which relies on a leachate collection and treatment system to reduce migration. Such a design is expected to result in a requirement for continued active site maintenance, therefore violating the performance objective in § 61.44.

Several comments recommended that the natural resources considered under § 61.50(a)(4) specifically include ground water and aquifers underlying the site and that the resources of significance were not limited to "economic" significance. Another suggested that the resources be "known" resources so that the applicant would not have to engage in an extensive exploration program to assure that there were no significant natural resources. The Commission considers ground water and aquifers to be natural resources in the context of this requirement. The Commission also agrees that it should not be necessary to conduct extensive exploration studies to prove that no resources exist. Several changes have been made in the sections relating to ground water to reflect these comments.

Commenters raised four questions on the siting requirements related to surface water drainage. These can be summarized as (1) definition of certain terms such as upstream drainage areas, coastal high-hazard area and wetland; (2) the adequacy of the exclusion of waste disposal based on the 100-year floodplain; (3) whether engineering drainage modifications can be made in order to meet the requirements; and (4) the vagueness of some terms.

With respect to the terms "coastal high-hazard area" and "wetland," these are defined in Executive Order 11988 (42 FR 26951, May 25, 1977), *Floodplain Management Guidelines* which is noted in the rule. The term "upstream drainage area" can be defined in conventional hydrologic terms as all the land surface which drains, either by channel flow or sheetwash, across the disposal facility.

The 100-year floodplain is that land which would be inundated by a flood having a 1 in 100 chance of occurring in any particular year. The Commission feels the major hazard due to flooding is associated with the period of site operations when disposal units are open. Because of other provisions of the rule, the disposal units will be open a comparatively short time. Once closed, the covers and site drainage system will

provide protection against the effects of flooding. The Commission considers 300 or 500-year floodplains to be unnecessarily restrictive; and questions whether an adequate data base or standard methods of determining such floodplains exist.

The question on engineering modifications will be addressed more fully in staff technical positions related to site suitability, selection and characterization and to site design and operations. Engineering features may be used to improve site drainage and protect against flooding during operations.

With respect to the vagueness, or non-prescriptive, nature of the requirements, the Commission considers the siting requirements as site screening tools which will be met in most cases and which, if not met fully, would require a site-specific evaluation to determine whether an exemption is warranted. The Commission finds this preferable to treating more prescriptive siting requirements as exclusionary.

Minor changes of a clarifying nature have been made to the requirements related to flooding.

Several commenters suggested that radioactive waste disposal facilities could be collocated with hazardous waste disposal facilities. The Commission does not object to this as long as the facilities are separated from one another and the wastes are not commingled. The provisions of § 61.50 pertaining to nearby facilities not adversely impacting the ability of the site to meet the performance objectives or significantly masking the environmental monitoring program would have to be met.

Several commenters raised the question of relevance of seismic or volcanic hazards to low level waste disposal, given the orders of magnitude difference between the time frames for those geologic phenomena and the hazard of the low-level wastes. Concern was also expressed that certain areas, such as California, would have all potential sites eliminated by the requirement to avoid seismic areas.

The requirement, as written, provides the Commission a mechanism for site specific evaluation of such factors as recurrence intervals, probabilities, liquefaction potential, and ground accelerations to compare against a long-term (500-year) radiological hazard and the disposal requirements of Part 61. This minimum technical requirement would not arbitrarily eliminate potential sites so much as it would provide a site screening test which will be met in most cases and will mandate a thorough

evaluation of site performance in areas of known tectonic hazards.

Several persons commented on the reliability of long term projections of population growth. The Commission recognizes such projections have a degree of uncertainty. Part of the staff review of any projection focuses on this uncertainty and how it has been handled by the applicant. Previous experience with commercial low-level disposal sites illustrate that suitable sites can reasonably be found in areas of low population density and minimal population growth potential.

Two commenters suggested a siting requirement based on accessibility to major transportation routes. This issue becomes a consideration in site selection and the evaluation of alternatives required under NEPA and is not necessary in the rule.

Individual comments were received suggesting siting requirements related to mechanical and physical properties of soils to make them suitable for compaction and supporting construction equipment, and requirements to avoid areas of high natural radioactivity. Changes to the rule were not deemed necessary. The mechanical and physical characteristics of soils are factors to be addressed in the site design and operations in order to meet stabilization requirements and objectives. With respect to areas of high natural radioactivity, these areas would be excluded if they could be shown to violate the ability to carry out a monitoring program. Otherwise, the Commission sees no valid reason for excluding these areas.

Several commenters raised the general question of the length of time the various siting or design requirements have to be satisfied. Others requested that the design basis natural events or phenomena be identified and that the length of time for consideration associated with these be stated.

The siting, design, and waste form requirements relate to both stability of the disposal site and control of releases within acceptable limits. Reliance must be placed for a longer time on the site since the waste form and design features will decrease in effectiveness over time. Therefore, each of the siting requirements should be considered applicable over the indefinite future and should be evaluated for at least a 500-year time frame. A 500-year time frame for design basis natural events or phenomena should also be applied.

Subpart D: § 61.51. Disposal Site Design for Land Disposal. Five commenters objected to the absoluteness of the requirements in

§ 61.51 relative to preventing infiltration and eliminating the contact of water with waste. Comments were also expressed requesting preferential consideration be given to progressive slope design for burial and concern was expressed that the rule does not provide specific guidance for engineered features. Commenters also expressed concern that site areas used for disposal of Class A waste will require more maintenance.

The requirements referred to are expressed as design objectives. Given that these are design objectives, the actual achievement will be to minimize, rather than absolutely prevent or eliminate. The achievement level should be as near the design objectives as is practicable. The wording of these paragraphs has been changed to reflect this. With respect to progressive slope design for burial, the regulation does not specify the type of disposal unit. The site designer should give particular attention to the design of that portion of the facility used for the disposal of Class A wastes so that the inherently unstable Class A wastes will not interfere with the long-term stability of the site.

Four commenters recommended that warning signs or permanent identification monuments be employed as a deterrent to inadvertent intrusion. Several suggested a design lifetime of 500 years for such markers.

Although there are few "signs" in the traditional sense that have design lives approaching 500 years, the Commission would consider such things as granite monuments near the survey marker control points as an appropriate adjunct to the physical intruder barriers employed in the disposal of the waste. A change to the rule has been made to require such monuments at the time the license is terminated.

Subpart D: § 61.52, Land Disposal Facility Operation and Disposal Site Closure. There were several issues related to facility operation and site closure identified by about thirty commenters. A half dozen commenters raised questions with respect to the requirement that Class A waste be segregated from other classes of waste. Questions also addressed the need for segregation during transportation, the meaning and intent of the term "interaction," and the need for segregation in arid sites.

The intent of the rule is not to prohibit waste from more than one class from being shipped on the same transport vehicle. Consistent with appropriate transportation regulations, the Commission has no objection to commingling different classes of waste in transport.

In identifying the need to clarify the term "interaction," the commenters noted that it was vague and unenforceable, could include migration, and could be physical or chemical interaction.

The intent of the rule is to protect Class B and C wastes. Class A wastes could interact with other wastes directly through the release of absorbed liquids, solvents, or other mobile components that might be present in Class A waste. Indirect interaction could result from degradation of Class A waste and its lack of stability. Consolidation of Class A wastes would provide a less stable support which could contribute to failure of the disposal unit cover leading to increased precipitation infiltration and surface water intrusion. The degree to which these interactions could occur depends to a large extent on site specific characteristics and the Commission does not believe that it is appropriate to set a prescriptive requirement in this area in the rule. The wording of this requirement has been changed to define the purpose for the segregation and minimization of interaction between the segregated wastes. The rule also permits Class A waste that meets the stability requirements to be placed with Class B and C wastes.

The State of Washington regulates the disposal site located in an arid region near Richland, Washington. The State noted that without the likelihood of ground water or surface water being factors at arid sites, segregation of Class A wastes seems to be unnecessary. They also noted that commingling Class A and B wastes would dilute the Class B wastes and have potential benefit.

The State's observations may have merit for arid sites but are difficult to adopt in a rule that must address sites located in all parts of the country. The Commission anticipated the need to consider alternative disposal requirements and included § 61.54, "Alternative requirements for design and operations" to provide for consideration of such alternatives.

A number of commenters noted that factors other than waste form play a role in assuring the stability of the site. In the area of site operations, these factors are identified as the way in which waste is emplaced and the filling of voids in between waste packages after emplacement. Several pointed out the stability problems (slumping, etc.) that could still be associated with disposal units containing the segregated and unstable Class A waste. A number of commenters objected to the requirement that wastes must be emplaced in an orderly manner because of perceived increased exposures. The

requirement that was proposed in paragraph (4) of § 61.52(a) was intended to assure that the placement of packages into a disposal unit did not destroy the integrity of the package in order to minimize the possibility of releases of contamination, and also to minimize the void spaces between packages so that this would not be a contributor to site instability. It has been a common practice at waste disposal facilities to dump some wastes over the edge of a disposal trench with the packages falling and tumbling to the trench bottom where they ended up a random arrangement. This practice jeopardizes package integrity and does not permit access to voids between packages so that they could be backfilled. The assumption by the commenters that orderly emplacement necessitates increased handling by site operators with resultant higher radiation exposures is not necessarily the case. Lifting and stacking devices are currently in use for low level waste disposal that permit remote lifting and emplacement in the disposal trench without increased occupational exposure. The resulting emplacement meets the intent of protection of packaging integrity and access to void spaces. Since the term "orderly" was subject to misinterpretation, the requirement has been rewritten to remove the term and to specify the objectives of emplacement.

Six commenters addressed the requirement for maintaining a buffer zone of at least 100 feet. These comments generally supported the concept and purposes of a buffer zone, but questioned whether the specified 100 feet was sufficient. The Department of the Interior suggested that the buffer zone should be three dimensional to include some distance below the disposal site.

In response to these comments, the Commission has restated the requirement in terms of the objective to carry out monitoring activities and take mitigative measures if needed, and has made the buffer zone three dimensional.

Several persons commented on the need to conduct ancillary activities at the disposal facility such as storage, waste treatment, truck terminals, etc. Concern was expressed over the language in § 61.51(a)(7) that would seem to preclude such activities. Others felt that provisions should be made in Part 61 for the description and licensing of such activities.

The provision of § 61.51 that caused the concern was that the disposal site shall be used exclusively for the disposal of radioactive wastes. The

intent of this provision was to prevent the disposal of wastes such as toxic or hazardous chemicals which do not contain radioactive material at the facility. It was not intended, as could easily be inferred from the way the requirement was worded, that disposal is the only activity that could take place. Corrective word changes have been made to clarify this. The purpose of Part 61 is to specify the regulatory requirements for the disposal of radioactive waste. Existing requirements in Parts 30, 40, 70, *et al.*, would govern the licensing of other activities involving licensed radioactive materials, such as waste treatment or storage.

Several comments questioned the meaning of the term "a few percent above background" as applied to the requirement that limits radiation levels at the surface of the disposal unit cover. Some suggested values from as low as 1 percent of background to as high as 1 mrem/hour (about 5,000 percent of background). One commenter suggested that the radiation limit should not be confined to gamma radiation, but should be expressed as a dose rate to include other types of radiation.

The rules in Part 20 contain provisions for permissible levels of radiation in unrestricted areas in § 20.105. The Commission considers these to be appropriate for application at the time that the disposal facility license is transferred to the site owner for the period of institutional control. Although access to the site will be controlled to prevent inadvertent intrusion and the site could be viewed as a restricted area, the Commission believes it is not proper to consider those who do have access, such as caretakers and site maintenance personnel, as radiation workers who could receive much higher occupational exposures. Therefore, § 31.52(a)(6) has been changed to reflect the Part 20 unrestricted limits.

A number of other individual comments and suggestions were considered and were addressed in the detailed analysis of comments. Some clarifying changes were made to the rule as a result.

Subpart D: § 61.53, Environmental Monitoring. Only nine commenters addressed the provisions for environmental monitoring. One commenter observed that analyses of release pathways should be conducted so that they may be validated by data acquired from subsequent monitoring, a point with which the Commission agrees. Two comments addressed the 12-month preoperational monitoring requirement: one thought it too long, the other too short. While a one-year period

of site specific data may not provide the range of fluctuations in data expected over a longer period, the site specific data can be augmented by reconnaissance level data or regional data that can be correlated with the site-specific data. These activities should be started early enough in the site development process that they do not interfere with a timely submittal of an application. Additional data may be obtained as the licensing process continues which can be used to update the application.

It was noted that the environmental monitoring requirements are not detailed or specific and at least one commenter suggested that highly detailed prescriptive requirements be set forth. Because of the wide variety of site-specific conditions, and a desire to avoid overly prescriptive requirements in Part 61, the Commission does not feel that this suggestion is practicable. A Branch Technical Position on Monitoring is being prepared and will provide additional guidance.

It was pointed out that one important purpose of a monitoring system is to provide early warning of migration of radionuclides from the disposal site before they leave the site boundary. The Commission agrees, and has made a clarifying change to that effect.

The Department of Interior recommended that "geochemistry" be added to the site characteristics to be studied. This has been done.

Subpart D: § 61.55, Waste Classification. Over half of the commenters on Part 61 offered comments on one aspect or another of the waste classification provisions. Nearly 20 different issues were identified and addressed in the staff's detailed analysis of comments. In general, there was support for the concept of identifying wastes that were generally acceptable for near-surface disposal and further dividing this general category into more specific classes. Most of the comments were related to understanding how these categories were established and the basis for them; support for further identifying a class of waste that would not be of any regulatory concern because of its low radioactivity, i.e., a "de minimis" level; what should the upper limits be particularly for certain radioisotopes such as the transuranic elements; what provisions will be made for disposal of waste that exceed the limits for near-surface disposal; and how does a waste generator show compliance with the waste classification requirements. There were a large number of comments requesting clarification and restructuring of the

requirements to make them more understandable, as well as a number of miscellaneous comments.

With respect to those comments that the numbers used to define waste classification were not adequately explained or supported in Part 61, it should be noted that most such comments were submitted before the supporting Draft Environmental Impact Statement (DEIS) for Part 61 became generally available. Since a considerable part of the DEIS is devoted to the derivation of the waste classification numbers, the Commission does not feel that the basis needs to be repeated in detail in the rule. The Commission is preparing an analysis of the comments received on the DEIS and these comments will be factored into the final EIS to make the basis for waste classification values more understandable. Other commenters on the numerical values suggested the use of values reported in an earlier NRC contractor document, NUREG/CR-1005. The present waste classification scheme proposed in Part 61 drew on this and other earlier work; however, the earlier approaches to waste classification did not consider the effects of stability or waste form.

Table 1 Proposed values for several radionuclides that were the same value regardless of the class of waste. This has led to some confusion and misunderstanding. In the disposal of wastes, precautions are taken to provide protection against intrusion for the first several hundred years. These precautions include institutional controls, waste form requirements, and intruder barriers. There are certain radionuclides common to waste that are of such a long half-life that they will be present several hundred years from now in essentially the same concentration as when they were originally disposed. Therefore, the rule limits the initial concentrations of these radionuclides to values that will be acceptable after several hundred years when the intrusion protection measures are not considered to be effective.

Over one fourth of all commenters endorsed the concept of setting levels for wastes below which there is no regulatory concern, the so-called "de minimis" level. Some of the commenters supporting the de minimis concept made direct reference to the Commission's position that exempting particular waste streams from compliance with the Part 61 regulations was preferable to setting generic levels for all isotopes. Several disagreed with this position, although at least one of these commenters remarked that as there is not yet a consensus on a

generic de minimis level, any level chosen would be premature. A number of other commenters suggested that a de minimis classification be added to the Part 61 regulations, perhaps as an additional column in Table 1.

Several commenters suggested that NRC permit case-by-case review of requests for specific application of the de minimis concept during the period criteria are being developed. Others suggested specific values for specific waste streams or radioisotopes.

The fundamental concern of practically all commenters was not as much whether a generic or a case-by-case approach be taken, but rather that action to develop de minimis standard should be taken as soon as possible.

The Commission agrees with the importance of setting timely standards for disposal of certain wastes by less restrictive means. The Commission agrees with the commenters that establishment of such de minimis levels would reduce costs of disposal for many licensees and would also conserve space in disposal facilities which are otherwise designed for wastes having much higher activities. The Commission also believes that establishment of de minimis levels is important in enhancing overall stability of a disposal facility, and therefore in reducing potential long-term site maintenance and corresponding costs, since de minimis levels would reduce the volume of Class A waste. This would also tend to reduce ground water migration impacts, since subsidence and water infiltration would be reduced.

Regarding the issue of setting de minimis levels on a generic or on a case-by-case basis, the Commission still believes that the current policy of examining waste streams on a case-by-case basis will result in the quickest and best results. It is recognized that setting generic limits may be a desirable goal, and the Commission Plans to work this goal over the next few years. Meanwhile, the Commission believes that the process of examining a few specific waste streams will facilitate the development of generic requirements and is accelerating its efforts on setting standards for disposal of wastes by less restrictive means. In this regard, the Commission staff is willing to accept petitions for rulemaking from licensees, licensee organizations, or others for declaring certain waste streams to be of no regulatory concern. Such petitions should provide at least the following information:

- A description of the process by which the waste is generated;

- A description of the waste generated, including chemical characteristics;

- The radionuclide content of the waste, including principal as well as trace contaminants;

- A description of the potential change in the radionuclide content as a function of process variations;

- A description of the process control and quality control programs by which the licensee would ensure compliance.

Waste streams common to a number of licensees and in which the radionuclide content is well known and relatively nonvariant are generally preferred. Individual licensees may also continue to request amendments for alternative disposal methods for the licensee's own waste pursuant to § 20.302.

Of all the values proposed in Table 1, the limits for contamination by alpha emitting transuranic elements received the most attention and comments. There were a number of issues raised related to the allowable concentration, ranging from its validity to the impacts of meeting the limit. By far the most comments were related to the magnitude of the limit. Of the 23 commenters on the transuranic issue, four thought the 10 nCi/gm limit should be retained or lowered, while the remaining 19 suggested that the limit be raised. Those who suggested that the limit be raised presented a number of supporting arguments. Many, if not most, of the commenters suggested that the limit could be safely raised to 100 nCi/gm. One argument given is the advantage of enforceability of the higher limit. With current measurement techniques, it is argued that it is very difficult if not impossible to certify that waste contains less than 10 nCi/gm, but much less difficult to certify that it is less than 100 nCi/gm. Others pointed out that a 100 nCi/gm limit would encourage volume reduction through incineration and other means while conversely, the 10 nCi/gm limit would discourage volume reduction, contrary to the Commission's policy on volume reduction. The commenters cited a number of reports, documents, and ongoing activities as providing justification for their contentions, including a proposed revision to the Department of Energy Manual Chapter 6511. Some commenters felt that the Commission's calculations were excessively conservative. The most common comment in this regard was that the analysis did not consider dilution by other wastes, and if that dilution were considered, the allowable concentration could be increased by an order of magnitude or more.

The commenters that supported the 10 nCi/gm limit or did not want it raised generally made statements of endorsement for the value because of prior use or because of the view that wastes exceeding this limit should not be buried at commercial low-level waste disposal sites. Concern in this regard was also expressed over the provision in § 61.58 that the Commission could, on a case-by-case basis, grant exemptions to the waste classification requirement, thereby permitting disposal of higher concentrations of transuranic radionuclides.

In response to these comments, the Commission has reevaluated the analyses for disposal of waste containing transuranic nuclides, in an attempt to temper unnecessarily conservative assumptions, such as not considering the dilution by other wastes that decay to essentially inert levels with time, so that more realistic estimates of consequences will result. As a result, disposal limits for Class C waste have been raised to 100 nCi/gm for long lived alpha emitting transuranic nuclides. For Class A wastes, the limit remains at 10 nCi/gm. The details and results of these analyses are presented in the Final Environmental Statement supporting Part 61.

Several commenters wanted to know what to do with waste containing Radium-226, a radioisotope which is not currently listed. It appears that there are two types of radium wastes to be considered: (1) small concentrated sources of radium such as radiation sources or luminescent dials, and (2) wastes which contain small amounts of radium incidental to other radioisotopes, such as radium contained in wastes from uranium separation processes. The former is not subject to regulation by the Commission, since radium is a naturally-occurring isotope and is not included in the provisions of the Atomic Energy Act of 1954, as amended. The Environmental Protection Agency has a program for collection of radium sources. This program may be phased out in the next few years. Such sources are expected to be transferred to the Department of Energy for storage and disposal. As for radium incidental to other types of waste, the Commission has made provisions for disposal of small quantities of uranium tailings as Class A waste. For purposes of this provision, a small quantity is defined as 10,000 kilograms containing not more than 5 millicuries of radium-226. This concentration is typical of uranium mill tailings (0.5 nanocuries per gram). The quantity of radium-226 is that contained in 150 pounds of natural uranium at

equilibrium with its daughter products. 10 CFR Part 40 permits any person to possess and use under general license 150 pounds of source material per year. Permitting the disposal of such a quantity in a near-future disposal facility is judged to be acceptable. For larger amounts, specific approval would be required.

Several commenters expressed concern with a footnote in Table 1 and § 61.55(d) which indicate that greater concentrations than Class C limits may be determined to be acceptable for near-surface disposal under certain conditions. Commenters were either opposed to permitting any higher concentrations or asked for clarification of what the requirements would be for higher concentrations.

The Commission established the Class C limits using the performance objectives as criteria to ensure safe disposal of waste considering the degree of protection provided by "normal" near-surface disposal. To ensure that the performance objectives are met, disposal of higher concentrations of isotopes than those listed in Table 1 would have to be by disposal technologies having greater confinement capacity or protection than "normal" near-surface disposal. Such improved disposal technologies could, depending on the particular radioisotopes, involve better waste forms or packaging, or disposal by methods having additional barriers against intrusion (e.g., burial at depths greater than 5 meters). The Commission believes that some flexibility should be permitted, provided the performance objectives are met, and therefore will evaluate exceptions on a case-by-case basis. In the meantime, the Commission is beginning studies to establish criteria for the disposal of wastes that are not normally suited for near-surface disposal. These would be the subject of future rulemaking.

Over one dozen commenters, nearly all of which were nuclear utilities or industry groups, expressed concern with how one determines compliance with the waste classification requirements. Most were concerned that the regulations would require them to routinely measure for every isotope in Table 1 within each package of waste. Many examples were given of the difficulty that this would present, citing heterogeneous waste mixtures, difficult to measure radioisotopes, increased costs, radiation exposures to personnel, etc. A number of suggestions were offered related to means of classifying the waste by its source, measuring key isotopes to infer quantities of more difficult-to-measure isotopes, and

establishing different limits for every disposal site.

The Commission expects licensees to carry out individual programs to assure proper classification of waste. However, the Commission does not feel that detailed measurements routinely made on all waste packages are necessary or desirable. The Commission staff is developing guidance to licensees on a number of alternative methods by which compliance can be shown. At present, the Commission staff has identified four basic programs which may be used either individually or in combination by licensees. They are: materials accountability; classification by source; gross radioactivity measurements; and direct measurement of individual radionuclides including scaling some radionuclides based upon measurement of others. These methods are discussed in the Branch Technical Position on Waste Classification being prepared.

Several commenters also raised the issue of averaging concentrations to comply with the concentration limits. One expressed concern about the potential for concentrated or "hot spots" of transuranic nuclides permitted under the proposed provision to allow concentrations to be averaged over the volume of the package. Since the trace transuranic nuclides in most shipments will be homogeneously distributed and incidental to the total activity, averaging over the packages is physically representative of the majority of wastes. Reprocessing or other future changes in waste streams which might change the transuranic character of the waste can be addressed in subsequent rule changes. Other commenters were concerned about potential ground water restricted inventory limits on radionuclides which are present in wastes in very low concentrations. Assay of individual packages for these nuclides is difficult as discussed in the preceding paragraph. Averaging the concentration of radionuclides such as Tc-99 or I-129 over the waste shipment or control on a total site inventory basis was suggested to minimize conservative over-reporting. Such over-reporting could exhaust site inventory limits and lead to inefficient use of the site. The Commission agrees. This issue will also be addressed in the Branch Technical Position on Waste Classification which will be available in early 1983. The concentration averaging language in the final rule was changed to provide additional flexibility for the specific guidance being developed in the Branch Technical Position.

In a related issue, a few commenters remarked on the difficulty of inspection

and enforcement to ensure compliance with the Part 61 requirements, citing past history of waste shippers not complying with the present DOT and NRC shipping requirements.

The Commission has recognized the importance of increasing inspection and enforcement activities in the processing, packaging, and transportation of waste. A number of programs have been initiated to improve compliance. At the present time, enforcement comes largely on the basis of provisions in the existing regulations (e.g., 10 CFR Parts 30, 40, and 70) that no licensee may transfer licensed material to another person unless that person is properly licensed to receive it. Requirements on waste form, concentrations, etc., are a part of the disposal site licensee's license. The Commission believes that issuing regulations to which all waste generators and disposal site operators would be subject will give the Commission a stronger basis for inspection and enforcement. Adoption of uniform requirements by Agreement States will greatly bolster the effectiveness of a national system of inspection and enforcement.

There were several commenters who argued that the waste classification scheme tends to discourage volume reduction, since this increases concentrations of radioisotopes and may result in a change in classification, or at the extreme, make the waste unacceptable for near-surface disposal. As long as the resulting concentrations of radioisotopes are within the limits set by Part 61, the Commission does not feel that waste classification necessarily discourages volume reduction. While a higher classification of waste might result in more stringent requirements on waste form and disposal methods, there are economic considerations that need to be considered by the waste generator. The cost of processing, shipping, and disposal of a small volume of higher classification waste needs to be compared with the transportation and disposal of a larger volume of a lower classification waste. There is no reason to believe that the balance will always be against volume reduction. For wastes with concentrations that would place them not generally acceptable for near-surface disposal if they were volume reduced, the provisions for specific Commission approval of the disposal of such wastes provides a potential alternative for licensees considering volume reduction.

Several commenters were concerned with materials which may be present in low-level radioactive waste which may be chemically toxic or hazardous. Some

suggested that the Commission's waste classification system incorporate a "total hazard" approach that would consider both the radiological and chemical hazard of wastes. At least one comment did not favor the total hazard approach because of the very complex classification system that the commenter perceived would result.

The Commission has stated publicly on several occasions that if it were technically feasible to classify waste by total hazard, then it would make eminently good sense to do so. We do not now know of any scheme for such classification; however, the Department of Energy intends to support research into the development of a classification system for hazardous waste that might be compatible with Part 61. In the meantime, the Commission will study the chemical toxicity of low-level waste, with special emphasis on identifying any licensees who generate hazardous wastes subject to requirements of the Environmental Protection Agency. We will look then at what could be done, perhaps through processing, to minimize the hazard.

Furthermore, the Commission believes that the technical provisions of Part 61 generally meet or exceed those expected in the Environmental Protection Agency's rules for the disposal of hazardous wastes. Although it is not the Commission's intent to allow disposal of hazardous wastes in a radioactive waste disposal facility, as is noted in the regulation, the Commission recognizes that such wastes may be present in low-level radioactive wastes. It is the Commission's view that disposal of these combined wastes in accordance with the requirements of Part 61 will adequately protect the public health and safety. Such hazardous wastes are expected to be such a small percentage of the total volume that dilution by other wastes would greatly minimize any risks. The Commission intends to work closely with the Environmental Protection Agency to assure continued compatibility. Further, EPA in its response to a resolution of the Conference of Radiation Control Program Directors indicated their willingness to work with other Federal agencies to address this problem.

Several commenters raised questions on the basis or criteria for setting site inventory limits for certain radionuclides, as was indicated in Table 1 of the proposed rule. Some correctly noted that such inventory limits would be site specific. The Commission established concentration limits for radionuclides based on a number of considerations, including protection of a

potential intruder, operational safety, and long-term site stability. In addition to concentration limits, the Commission desires the ability to limit maximum site inventories for some isotopes that are of concern from a ground water point of view. Isotopes which are both mobile and long-lived are iodine-129, technetium-99, and carbon-14. Tritium is of concern due to its extreme mobility and its presence in waste in large quantities. Establishment of inventory limits through site-specific license conditions for such radionuclides will help ensure that the performance objectives for ground water migration are not exceeded. The Commission does not plan, as was suggested by a few commenters, to establish site inventory limits for every isotope to protect against potential intrusion. Inadvertent intruder exposures are mainly controlled by the concentration of a particular isotope, and to a lesser degree by the site inventory.

Several commenters raised specific points about the cost and regulatory burden of the waste classification requirements. Much of the concern was related to the issue of costs for determining compliance with the concentration limits, as discussed earlier. The basis of the concentrations, in particular the 10 nanocurie per gram limit for transuranic nuclides was of concern and is discussed elsewhere. One commenter expressed the view that the classification requirements would raise the cost of disposal because of perceived increased cost for disposal of Class A waste and the cost of quality control activities.

While some costs will be associated with these concerns, when they are weighed against the longer term costs and institutional burdens that may result if the requirements are not adopted, the Commission judges the short-term costs to be warranted.

The State of Nevada, who regulates the Beatty site, expressed the view that the rule will increase the burden and expenses of the regulatory agencies. Two reasons cited related to monitoring the adequacy of site maintenance funds and inspection of waste generator packaging and classification activities.

Monitoring the adequacy of funding is already a part of the program for regulating disposal sites and is only peripherally related to waste classification in that stability is not assumed for Class A wastes. This is not different from the existing situation at disposal facilities where a large percentage of waste is not in a stable form. Thus, this does not appear to be a significant increase in regulatory

burden. Inspection of waste generators for compliance with waste classification is more the responsibility of the Commission or the Agreement State regulating the generator. Existing regulatory responsibilities include inspection of the packaging and shipment of radioactive waste. The incremental burden of reviewing a licensee's program for classifying these wastes should be small.

In addition to the above issues, a large number of commenters offered individual comments on a variety of points of clarification, format, definition, and completeness of the provisions for waste classification. While not summarized here, they are addressed in the detailed analysis of comments by the Commission staff, and to the extent practicable, these comments were reflected in the revision of § 61.55.

As a result of these comments, § 61.55 has been revised to present the classification values in two tables rather than one. Those radio-nuclides with long half-lives, along with some shorter-lived precursors of long-lived nuclides, are now listed separately in a new Table 1. The presence of these long-lived radionuclides will dominate the classification of the waste. If waste contains less than one tenth the concentration of such a nuclide listed in Table 1, it is Class A waste; greater than that, it is judged to be Class C waste provided the concentration does not exceed the value shown in Table 1. Shorter-lived radionuclides are listed with a range of concentrations in Table 2. Depending on the concentration, wastes containing only these shorter-lived nuclides will be judged to be Class A, B, or C. If waste contains nuclides listed in both tables, the mixture must be considered in determining the waste class. If Table 1 nuclides are present in concentrations less than one tenth the Table 1 limits, the class is determined by the Table 2 nuclide concentration. If Table 1 nuclides exceed one tenth of the Table 1 limits the waste is Class C regardless of the Table 2 concentrations.

The phrase "theoretical maximum specific activity" has been eliminated and replaced with a notation of "no limit." A footnote to Table 2 explains that while there is no theoretical limit for concentrations of certain nuclides in Class B and C wastes, practical considerations such as radiation and heat generation will determine the limits.

Several radionuclides have been removed from the originally proposed table. Cesium-135 was removed because it is present in wastes in very small concentrations and classification will be

determined by the presence of Cs-137 and because Cs-135 is a pure beta emitter which is very difficult to measure. Similarly, the radionuclides Ni-59 and Nb-94 have been removed except as they may be contained in activated metals. As examined in the draft environmental impact statement of Part 61, these nuclides are present in reactor wastes (other than activated metals) in such small concentrations as to be insignificant. Uranium has been removed as a radionuclide that must be considered for waste classification. The Commission's analysis shows that the types of uranium-bearing wastes being disposed of do not present a sufficient hazard to warrant limitation on the concentration of this naturally occurring material. Both depleted and enriched uranium do not contain daughter products in any quantity because of the relatively short time since the uranium was refined from ore, compared to the half-lives of the uranium isotopes. The daughter products are disposed of primarily as uranium mill tailings. Primarily for these reasons, the uranium limits were dropped.

For a number of radionuclides, the maximum allowable concentrations in Class C waste have been increased by a factor of ten. This came in response to a number of comments received on the proposed rule and the draft environmental impact statement that pointed out where unnecessarily conservative assumptions had been incorporated into the calculations for intruder protection. These comments pointed out that waste disposed beneath five meters of cover would be difficult to contact even at 500 years and that such waste would be diluted by the other wastes whose radioactivity had decayed to extremely low levels. Additionally, the average concentrations tend to be only a fraction of the maximum permissible. At the present time, these are recognized by the Commission as conservative assumptions and the Commission has found that an order of magnitude increase in Class C limits is warranted. This order of magnitude increase has not changed the established framework of factors such as relying on up to 100 years of institutional control and a 500 mrem whole body limit for intruders.

The radionuclide, curium-242, was added to the nuclides in Table 1. While Cm-242 is a relatively short-lived nuclide (163 days) it decays to plutonium-238, a transuranic nuclide with a half life of nearly 90 years. The concentration of 20,000 nanocuries per gram for Cm-242 will result in a

concentration of 100 nanocuries per gram of Pu-238.

To the extent practicable, the numerous footnotes originally found in the proposed Table 1 were eliminated and have been incorporated, where appropriate, into the textual part of the section on waste classification.

In response to a number of comments, a statement is made that permits the concentrations of nuclides in waste to be determined by means other than direct measurement. These methods may include such things as material accountability, where records of receipts, shipments, and inventories can confirm that waste concentrations could not exceed permissible concentrations. Other indirect methods might include "inferential" measurements where a ratio is established between nuclides in a mixture and the concentrations of the difficult-to-measure nuclide is inferred based on measurement of some easier-to-measure nuclide. Whatever the indirect method used, there should be reasonable assurance that the values determined could be correlated with actual measurements. For example, in the case of inferential measurements, the ratio on which the value is determined should be based on previous actual measurements. In the other example above, the receipts, shipments, and inventories should be based on measured value.

Subpart D: § 61.56. Waste Characteristics. A large number of comments were received addressing both the minimum and the stability requirements for waste form characteristics in § 61.56. The following summarizes the comments on the minimum requirements.

One commenter objected to the use of absorbent material to immobilize liquids contained in Class A waste, stating that using absorbent materials was an obsolete technique. The State of South Carolina recommended that this requirement apply only to institutionally generated aqueous or biological waste forms. Since various absorbents have been shown to be effective with liquids, such as organic solvents, oils, etc., the Commission sees no reason to restrict the use of absorbent material to aqueous or biological waste. The Commission does not see any reason to restrict the use of absorbents to institutional generators.

Eighteen commenters stated that the requirement (proposed in Table 1, § 61.55) to obtain specific approval to dispose of wastes containing greater than 0.1 percent chelating agents was too restrictive, and stated that utilities might decide against performing

decontamination operations which could reduce occupational exposures. Several commenters requested the basis for the 0.1 percent limit. One commenter recommended that no chelating agents be permitted.

Since chelating agents have been shown to increase the migration of certain radionuclides at certain sites, the Commission desired to evaluate the disposal of large quantities of wastes containing high concentrations of chelating agents on a case-by-case basis. This approach was used when the Commission staff reviewed the disposal of wastes that would be generated in the decontamination operations at the Dresden Unit 1 Station. Because the disposal of wastes containing chelating agents is dependent on the characteristics of the disposal facility and on the properties of the waste form, the Commission has modified the chelating agent disposal requirements to reflect this. The Commission has placed on the disposal site license applicant the responsibility for describing the conditions for disposal of waste containing chelating agents. If approved by the Commission, site specific requirements will be placed on the disposal facility licensee. At this time the waste generator will be required only to identify such wastes in the information contained on the shipping manifest.

At the request of comments, definitions have been added for the terms, "hazardous," "pyrophoric," and "explosive."

Of five comments received on the prohibition against packaging waste in cardboard or fiberboard boxes, four felt the prohibition is unnecessary. One commenter supported the provision. After reviewing the comments, including the reasons presented, the Commission still believes that such a prohibition is needed. The experience cited by the Department of Energy, of successfully using cardboard containers for waste packages at their sites, does not include extensive handling and transportation that commercially generated wastes might encounter. The existing prohibition against cardboard and fiberboard containers at existing disposal facilities came about as a result of unfavorable experience in receiving, handling, and disposing of wastes in such containers. No change has been made in this requirement.

Ten commenters addressed the requirements relating to waste in a gaseous form. Several noted an inconsistency between the provisions in §§ 61.56(a)(5) that prohibits wastes capable of generating toxic gases, and

61.56(a)(7) that permits up to 100 curies of activity in waste in a gaseous form. Several requested the basis for the 100 curie limit. A recommendation was made that gases should be processed into liquid or solid forms, and another felt that gases should be limited to several microcuries. The Department of Energy recommended that krypton 85 immobilized by zeolite encapsulation or ion implantation into metal be permitted with concentrations up to five million curies per cubic meter.

The intent of § 61.56(a)(5) is to prohibit the disposal of wastes that are chemically reactive under ambient conditions and produce toxic gaseous reaction products. This section is not intended to prohibit the disposal of properly packaged gases such as H-3 or Kr-85 which occasionally require disposal. This section has been reworded to clarify the intent. The 100 curie limit derives from the existing limits at commercial disposal facilities. The Commission has studies underway to determine whether higher limits would be appropriate. Such limits, if justified, would be proposed in a future rulemaking. In lieu of a requirement that gases be converted to a liquid or a solid, the Commission is evaluating the significant generators of tritium wastes and investigating improved package designs for tritium wastes which would be capable of retaining the contents until they had decayed to innocuous levels. The requirements of Part 61 do not contemplate the disposal of millions of curies of Kr-85 as suggested by the Department of Energy. The Commission is not prepared to set disposal requirements for this waste at this time, and since this waste is not liable to be generated by Commission licensees in the near future, the Commission believes there is ample time to assess the still emerging technology for krypton fixation and establish suitable disposal requirements through future technical guidance or rulemaking action.

Some commenters felt that the requirement in § 61.56(a)(1) that waste packages presented for disposal must comply with NRC and DOT transportation regulations implied that outer packaging such as shipping casks must also be disposed. This was not the Commission's intent. Since proper packaging for transportation purposes is specified in regulations elsewhere, the Commission feels that it is not necessary to restate them in Part 61, particularly in view of the confusion created. This requirement has been deleted.

As discussed earlier, the Commission is concerned with the possible hazards

presented by non-radiological components of the radioactive waste. This was recognized in the requirement proposed that wastes containing biological, pathogenic, or infectious material must be treated to reduce the potential hazard to the maximum extent practicable. The Commission believes it is prudent to add hazardous properties to this requirement and has done so.

A variety of comments were received on the proposed requirements in § 61.56(b) that pertain to the stability of Class B and C wastes. These are discussed below for the various aspects of the requirement.

Nine commenters commented on the statement that the requirements were intended to provide stability for at least 150 years. Three thought that the 150 years was overly restrictive and two recommended 100 years to correspond to the institutional control period. Others observed that some nuclides would not decay to low levels during the 150 years, that Class A waste should also be stable because of the presence of Cs-137 and Sr-90, that steel drums could not be expected to last this long, and that high integrity containers have not been tested for 150 years.

The Commission has reviewed the 150 year stability requirement with respect to the scenarios used to calculate the waste classification values. The property of stability contributes to meeting successfully several of the performance objectives set forth in Part 61. A waste that is stable for a long period helps assure the long term stability of the site, eliminating the need for active maintenance after the site is closed. This stability helps to assure against water infiltration due to failure of the disposal unit covers and, with the improved leaching properties implicit in a stable waste form, minimizes the potential for radionuclide migration in groundwater. Stability also plays an important role in protecting an inadvertent intruder, since the stable waste form is recognizable for a long period of time and minimizes any effects from dispersion of the waste upon intrusion.

The 150 year period was initially chosen to approximate the active life of a near-surface disposal facility, along with the periods of post-closure observation and institutional controls. At the end of this period, the intrusion scenario is based on the intruder readily recognizing any uncovered waste as something out of the ordinary with the result that no further attempts at construction or agriculture would be attempted. When other aspects of the performance objectives are considered,

however, a longer design life is called for. The waste should continue to maintain its gross physical properties and maintain a measure of its identity for several hundred years more to provide site stability and to keep the Class B and C waste recognizable and unsuited to the construction and agriculture scenarios postulated. Consistent with its desire to avoid prescriptive requirements where possible, the 150 year specification has been removed. It is the Commission's belief, however, that to the extent that it is practicable, waste forms or containers should be designed to maintain gross physical properties and identity over 300 years, approximately the time required for Class B waste to decay to innocuous levels. This is reflected in Commission staff technical positions.

Fourteen commenters indicated that the proposed requirement that a stable waste form maintain its physical dimensions within five percent was overly restrictive and impossible to achieve due to the impracticality of filling containers to 95 percent capacity. Commenters also noted that asphalt and polymeric solidification agents would be incapable of meeting this requirement because of their viscoelastic creep properties. Commenters also observed that the limit could entail added expenses.

Upon review of the proposed requirement, the Commission has concluded that there is not sufficient basis at this time to support a numerical limit for deformation of stable waste. The five percent value has been removed from this requirement. Reliance will be placed on the requirements that void spaces within packages must be minimized, that wastes must be emplaced in a manner that permits void spaces between containers to be filled, and that these spaces must be filled.

With respect to void spaces in waste containers being reduced to the extent practicable, six comments were received. Several requested specific criteria on how this would be met and if filler materials were needed. Two felt that economics would drive waste generators to package the maximum volume of waste into a container and that this requirement in the rule is unnecessary.

Due to the highly variable nature of wastes, the Commission believes that it is not possible or desirable to include specific criteria for minimizing voids. To the extent that void spaces can contribute to eventual instability of the waste, they should be eliminated or reduced as much as possible. This might be done in some cases by filling void

spaces with other wastes or inert materials.

Eleven commenters objected to the specific requirement that the stability of waste be maintained under a compressive load of 50 pounds per square inch (psi). Most felt that the specific requirement should be deleted and replaced by a more general requirement to reflect actual disposal site conditions and operations.

In response to these comments, the 50 psi specification has been removed from the rule. The specification was based on conservatively assuming maximum burial depths up to 45 feet and waste or overburden density of 150 lb/ft.³.

Testing performed on acceptable solidified waste specimens indicate that 50 psi compressive strength should be easily obtained. The Commission believes that while this is achievable, some latitude should be allowed for the design of waste forms and containers to reflect site conditions where burial depths may be less.

Since § 61.56(b) permits the stability of waste to be achieved by placing the waste in a suitable container for disposal, a number of comments addressed the properties such a container should exhibit and the uses to which it should be put. It was suggested that the Commission reexamine design criteria for a high integrity container for highly dispersible forms, and one suggested that such container should be used for both high and low concentration wastes. A major supplier of waste solidification technology questioned whether the use of a container reflected the best available technology and the concepts of ALARA.

Three commenters, two of whom are suppliers of waste solidification technology and services, felt that ion exchange resins should all be solidified and that disposal of ion exchange media by dewatering is not within the concepts of ALARA and use of the best available technology.

The Commission staff is preparing a technical position on waste form criteria, including design criteria for a high integrity container. Draft copies have been made available to interested parties for their review and comment. In short, the technical position states that the container must provide as much assurance of stability for as long as required for a stable waste form or product. It should be designed, to the extent that it is practicable, to contain the waste and maintain gross physical properties and identity over 300 years, under the conditions of disposal. The Commission believes that the use of containers to achieve stability is consistent with the concept of ALARA

and the use of the best available technology. Occupational exposures in using high integrity containers are expected to be similar to or less than waste solidification, either with mobile or installed systems.

Several commenters addressed the proposed limitation of free standing liquid which would require that such liquids be reduced to as low a level as is reasonably achievable, but in no case to exceed 1 percent. Further, the proposed rule stated that the liquid should be noncorrosive. There were no requests to increase the value. However, one waste solidification service supplier recommended a limit of zero, while the State of South Carolina recommended implementing the limits in the license for the Barnwell disposal facility, i.e., 0.5 percent for solidified wastes, 1 percent for waste in high integrity containers. Several commenters asked for a definition of the term "noncorrosive."

The Commission has reexamined the proposed limit on free standing liquid and judged that solidified wastes and wastes in high integrity containers should be addressed separately. The Commission has concluded that existing waste solidification technology can produce a waste form that is essentially free of free standing liquid. In order to compensate for potential condensation of water vapor sealed in containers, the Commission believes that a limit of 0.5 percent by volume is appropriate for solidified wastes. For dewatered products, such as ion exchange resins, that are in a container designed to ensure stability, it is very difficult to ensure that such products would meet a 0.5 percent requirement following transport to a burial site. Therefore, for dewatered products, 1 percent should be allowed to account for settling during the transport period. The non-corrosive properties of the liquid will be defined and discussed in a staff technical position, rather than in the regulation. To provide a degree of consistency between Class A wastes and the Class B and C wastes, the limitations on liquids in Class A wastes have been modified. Liquid waste must be packaged with sufficient absorbent material to absorb twice the volume of the liquid. Solid wastes with incidental liquids must meet the 1 percent free standing liquid requirement.

Two commenters pointed out what they perceived as inconsistencies between Part 61 and other Commission rules or guides. One of the guides referenced is the Effluent Treatment Systems Branch Technical Position 11-3. This document was revised in July 1981 and is consistent with Part 61 requirements. The Commission fails to

see inconsistency between Part 61 and its supporting EIS, with Appendix I of Part 50, or guidelines for storage of waste, as claimed by the commenters.

Subpart D: § 61.57, Labeling. Several commenters offered suggestions or raised questions on the requirement that waste packages be labeled to show the classification of the contents. The commenters suggested color coding, different wording, consistency with DOT labeling, minimum standards, and asked for clarification of responsibilities.

The requirement for labeling is to provide the disposal facility operator with information as to whether the contents are Class A, B, or C wastes so that he will be able to dispose of them in the proper manner. The Commission does not feel that a Federal standard for such labeling is warranted, only that it be clear and legible. Individual facility operators may have operating procedures that could be enhanced by label location, size, color, etc. Since the label is to benefit the operator, it is more appropriate for him to set specifications through contractual arrangement. A suggestion to simplify the nomenclature on the labels was adopted and a minor change was made in § 61.57.

Waste classification labeling is in addition to labels required by DOT for transportation purposes. There is a similarity in nomenclature between the Class A and B wastes and the Type A and B packages used by DOT. DOT requires that packages be labeled as to whether they are Type A or B, therefore, there could be some confusion if the packages are labeled to indicate the waste classification. However, DOT has a variety of numerical and alphabetical designations and it is difficult to avoid some similarity in designation.

Subpart D: § 61.59, Institutional Requirements. There were few comments on the requirement for State or Federal ownership of the disposal site. Those commenting expressed general support. One commenter suggested that the State should have an option to turn ownership and responsibility for long-term custody over to the Federal government. Such an option is not available under current law. In related comments, two commenters expressed concern over the State's responsibility and liability after accepting the disposal site for custodial care. Since the State does become responsible for the site, the State must be involved and aware of the operations and conditions at the site during its operation. This could be done through some independent oversight as landlord, or through participation with NRC in the

review of the initial application as provided in Subpart F of Part 61.

About twenty commenters addressed the appropriateness of the 100 year limit on institutional controls and its effect on wastes acceptable for disposal under the conditions prescribed by Part 61. All commenters expressed support in one way or another for defining a time frame for institutional control related either to the hazard duration of the waste or assurance of continued government stability or concern. It was generally agreed that waste that was potentially hazardous after the end of the assured institutional controls should be disposed of by methods providing greater controls and assurances against potential exposure. These comments are judged to support the provisions of Part 61 that combine institutional controls with waste form, site characteristics, and site design and operations to provide assurances that potential exposures will be with acceptable limits. Class A waste that is potentially accessible and unrecognizable is no longer hazardous after 100 years. Special provisions for waste being in a stable form and in some cases buried deep assure against potentially unacceptable exposures or releases for up to 500 years.

There were a number of suggestions that the period of institutional control should be raised from 100 to 300 years. There appear to be two basic reasons for these suggestions. One reason is that institutions such as a state or the Federal government can reasonably be expected to survive for much longer than 100 years. A second reason is that the 100 year restriction on institutional care affects the waste concentrations acceptable for disposal as Class A waste with resultant higher costs to the waste generator. With respect to the first reason, the Commission feels that it is not a question of how long the government can survive, but how long should they be expected to provide custodial care. Based on work done by EPA, public comments on a preliminary draft of Part 61 and an advanced notice of proposed rulemaking, and four regional workshops, a clear consensus was developed which supported the 100 year limit. The Commission has not seen any compelling reasons to change its view on the 100 year limit.

Some commenters expressed the view that the government landowner should have flexibility in controlling site access during the institutional control period and that productive uses of the land which would not affect site integrity should be permitted. The Commission agrees and words to that effect have

been added to the Concepts section, 61.7.

Subpart E: Financial Assurances. Approximately two dozen commenters responded to the proposed financial assurance requirements for closure and post-closure care. In general, the commenters expressed support for the rule's establishment of financial assurances for closure and for long term care of a LLW disposal site. Commenters mentioned that the existing history of LLW disposal sites revealed a strong need to require licensees to demonstrate evidence of financial responsibility so that the public health and safety were protected and also so that potential liabilities do not rest with state taxpayers.

Several commenters felt that the financial requirements should provide more detail. The Commission agrees and has prepared a draft Branch Technical Position on Funding Arrangements for Closure and for Long-Term Care of a LLW Disposal Site that provides definitive guidance for evaluating all financial assurances, including surety bonds.

One of the major points raised by a variety of commenters was that the proposed regulation failed to address financial responsibility for unanticipated contingencies at a LLW disposal site. One group expressed concern that the regulations set the stage for a "tax-payer funded bail-out" of poorly-run disposal sites. They felt the industry should bear these costs, and that the regulations should be written to make this explicit. Another commenter noted that the experience of the State of Kentucky with Maxey Flats emphasized the importance of making contingency funds available in the event that serious problems occur. They felt this issue should be addressed in the rulemaking. One State further noted that the rule failed to mention who would be financially responsible if problems occur at the site that cost more than were budgeted on an assumption of normal operation. These questions cover such a variety of different scenarios (i.e., Acts of God, licensee negligence, etc.) that it is not possible to specifically respond to all of the potential contingencies. However, a general response to the overall issue of responsibility for contingencies at a low-level waste disposal site is possible. These comments cover two different time periods—the post-closure period, when the original licensee is still responsible at the site, and the institutional control period, when the license has been transferred to the landowner of the site for a period of up to one hundred years.

In the case of the post-closure care period, the licensee would be responsible for all activities at the site found necessary by the Commission to protect the public health and safety. Financial responsibility for activities during the institutional control period are a matter to be worked out between the site owner (i.e., the State or Federal Government) and the licensee in their lease or other legally binding arrangement. It is possible that if the site owner were a state, they would work out an arrangement whereby the site operator would collect a surcharge from waste generators for the institutional control period. The rights and responsibilities of the State and the licensee would be determined at such a time.

With regard to contingencies, one commenter also asked who would assume responsibility for a site and its accompanying waste when it was closed prematurely by the NRC, due to rule violation. Responsibility for a site closed prematurely by the NRC would depend on the situation. Additionally, closure would be a last resort of the Commission, since the agency has other authorities, such as civil penalties, to require licensee compliance. In the event it would become necessary to close the site for health and safety reasons, the rule provides that the licensee continues to be responsible until the license is terminated. In the event that the licensee's financial condition deteriorated so that he was unable to maintain the site to protect the public health and safety, then the Commission would probably require the site owner (either the State or Federal government) to assume responsibility at the site.

Regardless of who assumed responsibility for a prematurely closed site, the rules require that a licensee have available at all times during the site life, sufficient financial guarantees to ensure that sufficient funds are available for site closure and decommissioning. These funds would be available for properly maintaining the site if the original licensee were unable to do so.

Several commenters considered that the rule should resolve the issue of financial responsibility for contingencies by requiring liability insurance or specific language that licensees would be required to indemnify property owners in case of off-site migration. Although not proposed in the original rule, the staff evaluation of these public comments indicates there is a need for licensees to provide financial responsibility for liability coverage for

off-site bodily injury and property damage. The Commission thinks the public health and safety and the environment would be protected from unanticipated contingencies by such coverage, as well as assisting the States in establishing disposal sites. Four existing LLW disposal facilities currently carry this type of liability coverage, and several other State and Federal agencies, including EPA have imposed similar requirements for hazardous and radio-active waste facilities in order to protect the public health and safety and the environment. However, at the present time, the Commission's only statutory framework for establishing such a requirement is Section 170 of the Atomic Energy Act, also known as the "Price-Anderson" Act. This type of coverage is designed to cover "catastrophic events" primarily for nuclear reactor licensees, and the Commission feels this coverage would be in excess of the risk at a low-level waste facility. Therefore, the Commission has not established a third party liability requirement in this regulation. The Commission will strongly encourage licensees to continue to carry third party liability insurance coverage through the conventional insurance market.

A variety of comments were received concerning the short term financial assurances required for closure and decommissioning. Several commenters supported the rule's use of a variety of different options for closure, noting that flexibility was crucial if the proposed rule was to function in a reasonable manner.

Other commenters expressed support for the rule's provision requiring that the amount of surety liability change with changes in cost estimates. One commenter also was concerned that the financial surety arrangements increase in value over time to compensate for the effects of inflation. The rule allows the Commission to periodically assess the amount of funds collected for both closure and post-closure care of the site and if necessary, the Commission could require the financial assurances to be increased to account for inflation, unforeseen problems, and unanticipated costs.

Commenters expressed support for the variety of alternatives allowed to demonstrate short term financial responsibility. However, several commenters mentioned that no commercial market exists to provide surety bonds of the type mentioned in the rule. In developing the rule, the Commission is aware that surety bonds of the type proposed in the rule may be

unavailable at this time. However, the Commission included this alternative in the rule in the event that this type of coverage becomes available in the insurance market at a later time.

Commenters were also divided about whether the Commission should allow self-insurance as a financial assurance for closure. Several commenters felt that self-insurance would not satisfy the surety requirements, and they recommended that licensees should be required to place specific funds in escrow to cover costs of decontamination, closure and stabilization. Another commenter suggested that self-insurance be based on an annual submittal of financial reports, i.e., a financial test.

The Commission rejected the use of stand alone "self-insurance" based on the Commission's lack of confidence in this method to provide adequate assurances. Further, state officials have informally expressed the need to have tangible funds available from the licensee for site closure, so the State as landowner would not be left financially responsible. While not specifically allowing its use on a generic basis in the rule, the Commission will evaluate the use of financial tests proposed by licensees on a case-by-case basis.

Commenters also expressed support for the need to have a long-term care fund established at the time a license is issued. Some commenters wanted the rule to explicitly require the licensee to set aside funds for long-term care. However, the Commission currently lacks the authority to require a licensee to establish a fund to provide for long-term care of the site after the license is terminated. Instead, the Commission can only require a licensee to provide evidence of entering into a lease or other binding arrangement with the site owner indicating that the two parties have established financial responsibility for long-term care between themselves. With regard to the lack of authority, one person suggested that the Commission ask Congress for authority to require financial assurances for licensees for the active institutional control period. The NRC has raised this issue with Congress both in testimony and in a letter commenting on waste legislation.

Subpart F: Participation by State Governments and Indian Tribes. Many of the comments on Subpart F were concerned with interpretations and clarifications. These have been answered in the detailed analysis of comments. Two noteworthy changes were made. In § 61.71, a change was made to ensure that the Director shall make Commission staff available for

discussion with the State or tribal governing body. At the request of the Department of the Interior, a statement was added to § 2.101 to indicate that the Commission will inform the U.S. Bureau of Indian Affairs when tribes have been notified of the filing of an application.

The Commission has been examining ways by which the licensing process can be shortened in time. One way is to conduct activities in parallel where possible, rather than sequentially. One such area is in the submittal and evaluation of proposals by States and Indian tribes for participation in the NRC license review, as provided by Subpart F. As proposed, § 61.72 would provide up to 120 days after an application was docketed for a State or tribe to submit a proposal for participation. The time from initial submittal of the application until it has been docketed is estimated to be 60 days or more. Thus, there is a potential delay of 180 days between the time NRC would receive a proposal and could begin the serious consideration of the proposal. Until resolution were reached on the role a State or tribes would play in the review, the NRC's review of the application could be significantly hampered.

The Low Level Radioactive Waste Policy Act of 1980 clearly states that it is a State's responsibility to provide for the disposal of low level waste. The Act also provides for the formation of interstate compacts for this purpose, subject to Congressional approval. Thus, any application for a disposal facility license will have had State or compact participation and backing for a significant period of time before submittal. During this time, the Commission believes that the State will have had ample opportunity to determine what role it wants to play in the review of the application. This also holds true for other States that are parties to an interstate compact. Therefore, § 61.72 is being changed to require that a proposal from the State in which the facility is proposed, or from any State involved in a compact with the State, must be submitted within 45 days after the application has been tendered. However, the Commission notes that a more prompt submittal by the State would help reduce delays.

Although it is to be hoped that the States will inform Indian tribes of plans for disposal facilities and provide them with sufficient information to permit them to make a proposal at an early time, there is no way of ensuring this. Therefore, Indian tribes and States not covered above will be given 120 days from the tendering of an application to

submit their proposal. It is anticipated that the participation of Indian tribes and non-compact States will not impact the schedule of the licensing process as much and this additional time can be accommodated.

The Commission believes that there should be sufficient information in the tendered application on which to base a proposal and that it is not necessary to wait until the acceptance review is completed and the docketing procedure carried out.

By making these changes, review of proposals can be carried out earlier and in parallel with the other reviews. It is expected that this could reduce the licensing time by up to six months.

It should be noted that participation by States and Indian tribes pursuant to Subpart F of Part 61 is not through an adjudicatory hearing. If an adjudicatory hearing is requested, then 10 CFR Part 2 applies.

A provision was added to § 61.25 to ensure that State, local, and Indian officials were notified of the opportunity for a hearing for certain types of amendments to the disposal facility license.

Subpart G: Records, Reports, Tests, and Inspections. Several commenters made suggestions on records and reports and the need for resident inspectors. Comments were also offered encouraging state involvement in records review and inspections. Two suggestions, relative to reporting any release of radioactivity and a requirement for maintaining duplicate sets of records were rejected as being impracticable. The Commission, however, would encourage protection of records so that they would not be vulnerable to loss because of fire, flood, or other occurrence. The other suggestions did not require modification of the regulations in order to accomplish what was suggested.

10 CFR Part 2: Rules of Practice. No major issues were raised by the several comments on the proposed amendments to Part 2.

10 CFR Part 20: § 20.311 Transfer for Disposal and Manifests. Because any licensee might make a waste shipment and thus be subject to the proposed manifest system requirements, the Commission mailed copies of the proposed rules to each of the Commission's approximately 9,000 licensees. In addition, some 12,000 copies were furnished to the Agreement States for distribution to their licensees. Out of this large group came a total of 29 letters commenting on the manifest system. These comments were wide ranging, with the majority of questions or suggestions being raised by only one

commenter. Only a handful of issues drew more than one comment, with four being the largest number of comments on any issue. As a result of these comments, several changes were made to the proposed requirements to clarify some aspects.

To deal with the situation where a waste collector picks up waste directly from the generator, provisions are made for delivering the manifest to the collector at that time. The waste collector will not be required to attach copies of all waste generator manifests to his, as long as the collector's manifest has the information for each package that is required by § 20.311(b). The person transferring wastes will be required to maintain a signed copy of the manifest or equivalent documentation such as a computer generated printout from the transferee containing the same information and binding acknowledgement as the record required by Parts 30, 40 and 70 governing transfer of licensed material. This was done to provide inspectable records at the waste generator's facility which demonstrate compliance with the manifest requirements.

Changes were made in the requirements dealing with quality assurance. The term quality "assurance" has been changed to quality "control" and management's role has been modified to require evaluation of audits rather than the conduct of such audits.

Of note is that only one commenter, a midwest utility, addressed the question of the burden that the manifest would represent to small entities. When the manifest requirements were proposed, the Commission judged that they would not have significant economic impact on small entities. Pursuant to the Regulatory Flexibility Act, the Commission solicited comments on this matter.

General Comments

Seventeen commenters expressed concern with the use of absolute terms in the rule such as "eliminate" and "prevent." One was concerned about the lack of absoluteness of "reasonable assurance."

As discussed elsewhere, most of the places where such terms were used were in the context of design objectives. Since total achievement of such absolute objectives is unlikely, modifications have been made to the requirements to require minimization or prevention to the extent practicable.

Twelve commenters made suggestions on the kinds of additional regulatory guidance they felt was needed. The Commission agrees with the need for regulatory guidance and has a program

underway to provide such guidance, first in the form of staff technical positions, then as Regulatory Guides. Most of the topics addressed by the commenters are already under development. Consideration is being given to the development of guidance on other topics suggested by the commenters.

One commenter suggested exempting wastes in storage prior to the effective date of the regulation from the packaging and labeling requirements. This comment touches on a subject with broader implications, the phasing in of the Part 61 requirements, consistent with the ability of licensees, Agreement States, and applicants to make necessary changes to assure compliance.

The following sections and subparts will be considered a matter of compatibility for the Agreement States when the rule is adopted: Section 61.2, Definitions; Subpart C, Performance Objectives; Subpart D, Technical Requirements for Land Disposal Facilities; those portions of Subpart B that are necessary to implement the provisions of Subparts C and D; that portion of Subpart E requiring closure funding arrangements; and Section 20.311, Transfer for disposal and manifests. Meetings were held with Agreement State representatives and agreement was reached on a method for uniform implementation of the manifest requirements, waste classification, waste form, and the effective date of Section 20.311 which was set at 365 days after publication in the *Federal Register*.

Since all other provisions of the proposed rules would pertain only to applicants for new Commission-licensed disposal facilities, there are no reasons to delay the effective date of these requirements. The Commission is working with the Agreement States to develop model regulations to be adopted by the Agreement States in accordance with their agreements to maintain compatible state regulations.

Applicability of the requirements in Part 61 to Commission disposal facility licenses in effect on the effective date of the rule will be determined on a case-by-case basis and implemented through terms and conditions of the license or by orders issued by the Commission.

There were a variety of comments related to commenters questions about the development of new sites, concerns over nuclear facilities becoming *de facto* disposal sites, the need for an environmental impact statement, and an extension of the comment period for Part 61 to correspond with that of the environmental impact statement. These comments are addressed in the detailed

analysis of comments and had no effect on the rule. The comment period was, in fact, extended from October 22, 1981 to January 14, 1982 to correspond with that for the EIS.

About one third of all commenters offered editorial suggestions that were aimed at improving clarity, correcting grammatical errors, and noting typographical errors. These were very helpful in preparing the final version of the rule.

Employee Protection

A new 10 CFR 61.9 has been added concerning job protection for employees who provide information to the Commission. The new section is included in this final rulemaking to carry out the Commission's intent that all specific licensees will have similar responsibilities under its employee protection regulations. See the **Federal Register** notice (47 FR 30452) dated July 14, 1982 for the basis for this action.

New 10 CFR 61.9 emphasizes to employers—that is, licensees, applicants, and their contractors and subcontractors—that termination or other acts of job discrimination against employees who engage in activities furthering the purposes of the Atomic Energy Act and the Energy Reorganization Act is prohibited. In addition, new 10 CFR 61.9 makes the employee aware that if discrimination of this nature is believed to have occurred, a remedy is available through the Wage and Hour Division of the Department of Labor. To ensure that employees of licensees and applicants are aware of these amendments, these organizations are required to post their premises with explanatory material related to the prohibition of discrimination and availability of a remedy in the event of discrimination.

Paperwork Reduction Act

As required by the Paperwork Reduction Act, Pub. L. 96-511, the recordkeeping and reporting requirements in the proposed amendments to 10 CFR 20 incorporated in the 10 CFR 61 rulemaking were submitted to the Office of Management and Budget and were approved. The proposed amendments to 10 CFR Part 20 were not significantly altered as a result of public comments so that approval remains valid. The application, reporting, and recordkeeping requirements contained in 10 CFR 61 apply only to land disposal facility operators and affect fewer than 10 persons and, therefore, are not subject to OMB clearance.

Regulatory Flexibility Act

Based upon the information available and on the public comments received on the proposed rule, and in accordance with the Regulatory Flexibility Act of 1980, 5 U.S.C. 605(b), the Commission hereby certifies that this rulemaking will not, if promulgated, have a significant economic impact upon a substantial number of small entities.

The Regulatory Flexibility Act (Pub. L. 96-345) was signed into law in September 1980. The Act's principal objective is to make certain that Federal agencies try, where possible, to fit regulatory requirements to the scale of the affected activity. Significant economic impacts on a substantial number of small entities is a major concern. Part 61 and accompanying rule changes will potentially impact a significant number of persons licensed by the Commission and the Agreement States. The following discussion addresses the factors in the analyses required by the Act and the public comments received. The draft and final EIS's for Part 61 provide additional background information and analysis of the impacts of this rulemaking action.

Section 604 of the Regulatory Flexibility Act requires that the need for the regulatory action be clearly established. The need for standards to govern the disposal of low-level radioactive wastes and new regulations to implement these standards was discussed in detail in the draft EIS. The majority of the public comments supported the rule and thus affirmed the need for the rule and the regulator framework it establishes.

Section 609 of the Regulatory Flexibility Act requires that small entities have an opportunity to participate in the rulemaking when the rule will have a significant economic impact on a substantial number. Since the Commission's initial certification of no significant impact was a qualified one, special efforts to reach small entities were made. For example, the proposed rule was distributed to all Commission licensees (9,000) and made available to Agreement States (12,000 licensees) with a cover letter highlighting the points that might impact them. Comments were solicited from groups such as the Health Physics Society, a national organization of professionals concerned with radiation safety, many of whose members will have to prepare manifests and coordinate compliance with the rule. The Health Physics Society publicized the rule in its newsletters to members. Of some 107 different commenters responding, none specifically addressed

the Regulatory Flexibility Act or the summary analysis. One utility (which is not a small entity) did make a general qualitative reference to burdens on small entities. Twelve commenters representing a variety of sectors (not just small entities) addressed the potential burden of the manifest system.

Section 604 of the Regulatory Flexibility Act further requires a summary of the issues and a statement of any changes made in the proposed rule as a result of the comments. Two commenters were concerned about the burden of specifying chemical form. Four commenters objected to shipper responsibility for tracking shipments. Three commenters including one broker considered the system to be a paperwork burden and two, a general burden. Three supported the system and one indicated no problems in complying. Two objected to forwarding a copy of the manifest and one was concerned about the implications of generator certifications.

The proposed rule included relief language "as completely as practicable" for specifying chemical form. Small entities generate a significant percent of wastes and data on these wastes is needed, so no further relief was provided. Objections to shipper tracking and forwarding manifests stemmed primarily from the need to clarify intent of the rule on waste broker or collector role and responsibility. The transfer of papers and tracking responsibility is more clearly addressed in the final rule. The recommendation for simplifying the paperwork for brokers was adopted. These issues and concerns are addressed in more detail in the staff analysis of comments in the final EIS.

The comments on waste classification were discussed in the preceding summary and resulted in extensive revision of this portion of the rule to simplify and clarify the requirements. The detailed staff analysis in the final EIS provides further discussion of the issues raised.

Federal rules that overlap the proposed rule are primarily those of the Department of Transportation (DOT). The Commission and DOT have an established working relationship implemented through a formal Memorandum of Understanding. The rule itself acknowledges the need to comply with DOT rules, and the Commission currently inspects licensees for compliance with DOT requirements. The manifest required by this rulemaking is consistent with DOT shipping paper requirements, and the same document may be used by licensees to meet requirements of both

agencies. Neither NRC nor DOT require a specific form and both allow such dual use. The waste form and packaging requirements are in addition to and compatible with DOT rules. In addition, the manifest terminology and requirements were compared to those in the proposed Uniform Hazardous Waste Manifest, the joint EPA/DOT proposed form published March 4, 1982 (47 FR 9336). A few minor procedural and terminology changes were made to conform to this proposed form. Licensees may use the Uniform Hazardous Waste Manifest, once it is implemented, as both a DOT shipping paper and a NRC manifest for radioactive wastes by using additional spaces to describe wastes and adding information to the back. These changes were made based on consultation with EPA and DOT staff and will help to reduce the burden on all licensees.

The following comment was received from EPA on possible duplicative requirements:

NRC solicited comments on possible duplicative requirements for effluent releases and broker activities under the Comprehensive Environmental Response, Compensation and Liability Act of 1980 (CERCLA). This "Superfund" law exempts from notification "any release of source, special nuclear, or byproduct material . . . in compliance with a legally enforceable license, permit, regulations, or order issued pursuant to the Atomic Energy Act of 1954" (CERCLA Section 101(10)(K)). Radioactive releases from nuclear waste disposal facilities which are not in compliance with an NRC license, permit, regulation, or order fall within the reporting requirements of CERCLA. Furthermore, as part of the notification regulations under CERCLA, EPA is planning to develop a notification scheme for releases of radioactive materials not licensed under the Atomic Energy Act of 1954 or the Uranium Mill Tailings Radiation Control Act of 1978. EPA wishes to minimize duplicative reporting requirements for releases reported to other agencies. EPA intends to work with NRC to minimize duplicative reporting requirements to the extent possible.

The EPA also addressed the potential for duplicative costs to the two agencies for wastes that are a mixture of hazardous chemicals and radioactive materials. Close coordination and a memorandum of understanding were suggested. EPA has regulatory responsibility for the disposal of hazardous wastes under the Resource Conservation and Recovery Act (RCRA). NRC agrees that the two regulatory programs need to be coordinated, and will take action in that regard.

The Regulatory Flexibility Act also requires discussion of alternatives to the proposed action. The recordkeeping and

reporting requirements impose such a minor incremental burden that no exemption was considered. Initial estimates were that about 2,000 of the Commission's 9,000 licensees are waste generators who might make waste shipments. Waste generators must provide more complete information on the manifest than is currently required to meet DOT shipping paper requirements and must report on investigations of missing shipments. The additional information required in the manifest includes the identities of solidification agents; presence of any chelating agents; whether the waste is Class A, B, or C; and the total quantity of H-3, C-14, Tc-99, and I-129. The annual public burden for all licensees should be no more than about 4,500 staff hours for the preparation of the manifest instead of just preparation of DOT shipping papers and 1,000 hours for investigating and reporting on late or missing shipments. Reactor licensees, who are not small entities, ship at least half the waste now shipped to disposal sites. The remainder is shipped by hospitals, universities, industrial firms, etc., who may or may not be small entities. Thus, less than half this burden should fall on small entities based on relative volumes of wastes shipped. The waste classification and characteristics portion of the rule does provide relief for most wastes produced by the small entities, i.e., Class A wastes. Where radiological hazard permits, segregated disposal has been provided as an option to complying with more restrictive waste acceptance requirements for Class B and C wastes.

The incremental burdens were initially judged small. Based on further staff evaluations and public comments on the rule, this initial judgment was correct and the rule will not have a significant economic impact. The rulemaking will not affect economic factors such as employment, business viability, or ability of affected entities to compete. The improvements in waste disposal practices and the contribution of those improvements to establishing new disposal capacity are judged to significantly outweigh the small economic impact on small entities.

List of Subjects in 10 CFR Part 61

Low-level waste, Nuclear materials, Penalty, Waste treatment and disposal.

Pursuant to the Atomic Energy Act of 1954, as amended, the Energy Reorganization Act of 1974, as amended, and section 553 of title 5 of the United States Code, the following new 10 CFR Part 61 and the following amendments to 10 CFR Parts 2, 19, 20, 21, 30, 40, 51, 70, 73, and 170 to Chapter 1 of Title 10,

of the Code of Federal Regulations are published as a document subject to codification.

A new Part 61 is added to 10 CFR to read as follows:

PART 61—LICENSING REQUIREMENTS FOR LAND DISPOSAL OF RADIOACTIVE WASTE

Subpart A—General Provisions

- Sec.
- 61.1 Purpose and scope.
 - 61.2 Definitions.
 - 61.3 License required.
 - 61.4 Communications.
 - 61.5 Interpretations.
 - 61.6 Exemptions.
 - 61.7 Concepts.
 - 61.8 Reporting, recordkeeping, and application requirements: OMB approval not required.
 - 61.9 Employee protection.

Subpart B—Licenses

- 61.10 Content of application.
- 61.11 General information.
- 61.12 Specific technical information.
- 61.13 Technical analyses.
- 61.14 Institutional information.
- 61.15 Financial information.
- 61.16 Other information.
- 61.20 Filing and distribution of application.
- 61.21 Elimination of repetition.
- 61.22 Updating of application and environmental report.
- 61.23 Standards for issuance of a license.
- 61.24 Conditions of licenses.
- 61.25 Changes.
- 61.26 Amendment of license.
- 61.27 Application for renewal or closure.
- 61.28 Contents of application for closure.
- 61.29 Post-closure observation and maintenance.
- 61.30 Transfer of license.
- 61.31 Termination of license.

Subpart C—Performance Objectives

- 61.40 General requirement.
- 61.41 Protection of the general population from releases of radioactivity.
- 61.42 Protection of individuals from inadvertent intrusion.
- 61.43 Protection of individuals during operations.
- 61.44 Stability of the disposal site after closure.

Subpart O—Technical Requirements for Land Disposal Facilities

- 61.50 Disposal site suitability requirements for land disposal.
- 61.51 Disposal site design for land disposal.
- 61.52 Land disposal facility operation and disposal site closure.
- 61.53 Environmental monitoring.
- 61.54 Alternative requirements for design and operations.
- 61.55 Waste classification.
- 61.56 Waste characteristics.
- 61.57 Labeling.
- 61.58 Alternative requirements for waste classification and characteristics.
- 61.59 Institutional requirements.

Subpart E—Financial Assurances

Sec.

- 61.61 Applicant qualifications and assurances.
- 61.62 Funding for disposal site closure and stabilization.
- 61.63 Financial assurances for institutional controls.

Subpart F—Participation by State Governments and Indian Tribes

- 61.70 Scope.
- 61.71 State and Tribal government consultation.
- 61.72 Filing of proposals for State and Tribal participation.
- 61.73 Commission approval of proposals.

Subpart G—Records, Reports, Tests, and Inspections

- 61.80 Maintenance of records, reports, and transfers.
- 61.81 Tests at land disposal facilities.
- 61.82 Commission inspections of land disposal facilities.
- 61.83 Violations.

Authority: Secs. 53, 57, 62, 63, 65, 81, 161, 182, 183, 68 Stat. 930, 932, 933, 935, 948, 953, 954, as amended (42 U.S.C. 2073, 2077, 2092, 2093, 2095, 2111, 2201, 2232, 2233); Secs. 202, 206, 88 Stat. 1244, 1246, (42 U.S.C. 5842, 5846); Secs. 10 and 14, Pub. L. 95-601, 92 Stat. 2951 (42 U.S.C. 2021a and 5851).

For the purposes of Sec. 223, 68 Stat. 958, as amended, (42 U.S.C. 2273); Tables 1 and 2, §§ 61.3, 61.24, 61.25, 61.27(a), 61.41 through 61.43, 61.52, 61.53, 61.55, 61.56, and 61.61 through 61.63 issued under Sec. 161b, 68 Stat. 948 as amended (42 U.S.C. 2201(b)); §§ 61.10 through 61.16, 61.24, and 61.80 issued under Sec. 161c, 68 Stat. 950, as amended (42 U.S.C. 2201(o)).

Subpart A—General Provisions**§ 61.1 Purpose and scope.**

(a) The regulations in this part establish, for land disposal of radioactive waste, the procedures, criteria, and terms and conditions upon which the Commission issues licenses for the disposal of radioactive wastes containing byproduct, source and special nuclear material received from other persons. Disposal of waste by an individual licensee is set forth in Part 20 of this chapter. Applicability of the requirements in this Part to Commission licenses for waste disposal facilities in effect on the effective date of this rule will be determined on a case-by-case basis and implemented through terms and conditions of the license or by orders issued by the Commission.

(b) Except as provided in Part 150 of this chapter, which addresses assumption of certain regulatory authority by Agreement States, and § 61.6 "Exemptions," the regulations in this part apply to all persons in the United States. The regulations in this part do not apply to (1) disposal of high-level waste as provided for in Part 60 of this chapter; (2) disposal of uranium or

thorium tailings or wastes (byproduct material as defined in § 40.4(a-1)) as provided for in Part 40 of this chapter in quantities greater than 10,000 kilograms and containing more than five (5) millicuries of radium-226; or (3) disposal of licensed material as provided for in Part 20 of this chapter.

§ 61.2 Definitions.

As used in this part:
 "Active maintenance" means any significant remedial activity needed during the period of institutional control to maintain a reasonable assurance that the performance objectives in §§ 61.41 and 61.42 are met. Such active maintenance includes ongoing activities such as the pumping and treatment of water from a disposal unit or one-time measures such as replacement of a disposal unit cover. Active maintenance does not include custodial activities such as repair of fencing, repair or replacement of monitoring equipment, revegetation, minor additions to soil cover, minor repair of disposal unit covers, and general disposal site upkeep such as mowing grass.

"Buffer zone" is a portion of the disposal site that is controlled by the licensee and that lies under the disposal units and between the disposal units and the boundary of the site.

"Chelating agent" means amine polycarboxylic acids (e.g., EDTA, DTPA), hydroxy-carboxylic acids, and polycarboxylic acids (e.g., citric acid, carbonic acid, and glucinic acid).

"Commencement of construction" means any clearing of land, excavation, or other substantial action that would adversely affect the environment of a land disposal facility. The term does not mean disposal site exploration, necessary roads for disposal site exploration, borings to determine foundation conditions, or other preconstruction monitoring or testing to establish background information related to the suitability of the disposal site or the protection of environmental values.

"Commission" means the Nuclear Regulatory Commission or its duly authorized representatives.

"Custodial Agency" means an agency of the government designated to act on behalf of the government owner of the disposal site.

"Director" means the Director, Office of Nuclear Material Safety and Safeguards, U. S. Nuclear Regulatory Commission.

"Disposal" means the isolation of radioactive wastes from the biosphere inhabited by man and containing his food chains by emplacement in a land disposal facility.

"Disposal site" means that portion of a land disposal facility which is used for disposal of waste. It consists of disposal units and a buffer zone.

"Disposal unit" means a discrete portion of the disposal site into which waste is placed for disposal. For near surface disposal the unit is usually a trench.

"Engineered barrier" means a man-made structure or device that is intended to improve the land disposal facility's ability to meet the performance objectives in Subpart C.

"Explosive material" means any chemical compound, mixture, or device, which produces a substantial instantaneous release of gas and heat spontaneously or by contact with sparks or flame.

"Government agency" means any executive department, commission, independent establishment, or corporation, wholly or partly owned by the United States of America which is an instrumentality of the United States; or any board, bureau, division, service, office, officer, authority, administration, or other establishment in the executive branch of the government.

"Hazardous waste" means those wastes designated as hazardous by Environmental Protection Agency regulations in 40 CFR Part 261.

"Hydrogeologic unit" means any soil or rock unit or zone which by virtue of its porosity or permeability, or lack thereof, has a distinct influence on the storage or movement of groundwater.

"Inadvertent intruder" means a person who might occupy the disposal site after closure and engage in normal activities, such as agriculture, dwelling construction, or other pursuits in which the person might be unknowingly exposed to radiation from the waste.

"Indian Tribe" means an Indian tribe as defined in the Indian Self-Determination and Education Assistance Act (25 U.S.C. 450).

"Intruder barrier" means a sufficient depth of cover over the waste that inhibits contact with waste and helps to ensure that radiation exposures to an inadvertent intruder will meet the performance objectives set forth in this part, or engineered structures that provides equivalent protection to the inadvertent intruder.

"Land disposal facility" means the land, buildings, and equipment which is intended to be used for the disposal of radioactive wastes into the subsurface of the land. For purposes of this chapter, a geologic repository as defined in Part 60 is not considered a land disposal facility.

"License" means a license issued under the regulations in Part 61 of this chapter. "Licensee" means the holder of such a license.

"Monitoring" means observing and making measurements to provide data to evaluate the performance and characteristics of the disposal site.

"Near-surface disposal facility" means a land disposal facility in which radioactive waste is disposed of in or within the upper 30 meters of the earth's surface.

"Person" means (1) any individual, corporation, partnership, firm, association, trust, estate, public or private institution, group, government agency other than the Commission or the Department of Energy, (except that the Department of Energy is considered a person within the meaning of the regulations in this part to the extent that its facilities and activities are subject to the licensing and related regulatory authority of the Commission pursuant to section 202 of the Energy Reorganization Act of 1974 (88 Stat. 1244)), any State or any political subdivision of or any political entity within a State, any foreign government or nation or any political subdivision of any such government or nation, or other entity; and (2) any legal successor, representative, agent, or agency of the foregoing.

"Pyrophoric liquid" means any liquid that ignites spontaneously in dry or moist air at or below 130°F (54.5°C). A pyrophoric solid is any solid material, other than one classed as an explosive, which under normal conditions is liable to cause fires through friction, retained heat from manufacturing or processing, or which can be ignited readily and when ignited burns so vigorously and persistently as to create a serious transportation, handling, or disposal hazard. Included are spontaneously combustible and water-reactive materials.

"Site closure and stabilization" means those actions that are taken upon completion of operations that prepare the disposal site for custodial care and that assure that the disposal site will remain stable and will not need ongoing active maintenance.

"State" means any State, Territory, or possession of the United States, Puerto Rico, and the District of Columbia.

"Stability" means structural stability.

"Surveillance" means observation of the disposal site for purposes of visual detection of need for maintenance, custodial care, evidence of intrusion, and compliance with other license and regulatory requirements.

"Tribal Governing Body" means a Tribal organization as defined in the

Indian Self-Determination and Education Assistance Act (25 U.S.C. 450).

"Waste" means those low-level radioactive wastes containing source, special nuclear, or byproduct material that are acceptable for disposal in a land disposal facility. For the purposes of this definition, low-level waste has the same meaning as in the Low-Level Waste Policy Act, that is radioactive waste not classified as high-level radioactive waste, transuranic waste, spent nuclear fuel, or byproduct material as defined in section 11e.(2) of the Atomic Energy Act (uranium or thorium tailings and waste).

§ 61.3 License required.

(a) No person may receive, possess, and dispose of radioactive waste containing source, special nuclear, or byproduct material at a land disposal facility unless authorized by a license issued by the Commission pursuant to this part, or unless exemption has been granted by the Commission under § 61.6 of this part.

(b) Each person shall file an application with the Commission and obtain a license as provided in this part before commencing construction of a land disposal facility. Failure to comply with this requirement may be grounds for denial of a license.

§ 61.4 Communications.

Except where otherwise specified, all communications and reports concerning the regulations in this part and applications filed under them should be addressed to the Director, Office of Nuclear Material Safety and Safeguards, U.S. Nuclear Regulatory Commission, Washington, D.C. 20555. Communications, reports, and applications may be delivered in person at the Commission's offices at 1717 H Street NW., Washington, D.C. or 7915 Eastern Avenue, Silver Spring, Maryland.

§ 61.5 Interpretations.

Except as specifically authorized by the Commission in writing, no interpretation of the meaning of the regulations in this part by any officer or employee of the Commission other than a written interpretation by the General Counsel will be considered binding upon the Commission.

§ 61.6 Exemptions.

The Commission may, upon application by any interested person, or upon its own initiative, grant any exemption from the requirements of the regulations in this part as it determines is authorized by law, will not endanger

life or property or the common defense and security, and is otherwise in the public interest.

§ 61.7 Concepts.

(a) *The Disposal Facility.* (1) Part 61 is intended to apply to land disposal of radioactive waste and not to other methods such as sea or extraterrestrial disposal. Part 61 contains procedural requirements and performance objectives applicable to any method of land disposal. It contains specific technical requirements for near-surface disposal of radioactive waste which involves disposal in the uppermost portion of the earth, approximately 30 meters. Burial deeper than 30 meters may also be satisfactory. Technical requirements for alternative methods will be added in the future.

(2) Near-surface disposal of radioactive waste takes place at a near-surface disposal facility, which includes all of the land and buildings necessary to carry out the disposal. The disposal site is that portion of the facility which waste is used for disposal of waste and consists of disposal units and a buffer zone. A disposal unit is a discrete portion of the disposal site into which waste is placed for disposal. For near-surface disposal, the disposal unit is usually a trench. A buffer zone is a portion of the disposal site that is controlled by the licensee and that lies under the site and between the boundary of the disposal site and any disposal unit. It provides controlled space to establish monitoring locations which are intended to provide an early warning of radionuclide movement, and to take mitigative measures if needed. In choosing a disposal site, site characteristics should be considered in terms of the indefinite future and evaluated for at least a 500 year time frame.

(b) *Waste Classification and Near-Surface Disposal.* (1) Disposal of radioactive waste in near-surface disposal facilities has the following safety objectives: protection of the general population from releases of radioactivity, protection of individuals from inadvertent intrusion, and protection of individuals during operations. A fourth objective is to ensure stability of the site after closure.

(2) A cornerstone of the system is stability—stability of the waste and the disposal site so that once emplaced and covered, the access of water to the waste can be minimized. Migration of radionuclides is thus minimized, long-term active maintenance can be avoided, and potential exposures to intruders reduced. While stability is a

desirable characteristic for all waste much radioactive waste does not contain sufficient amounts of radionuclides to be of great concern from these standpoints; this waste, however, tends to be unstable, such as ordinary trash type wastes. If mixed with the higher activity waste, their deterioration could lead to failure of the system and permit water to penetrate the disposal unit and cause problems with the higher activity waste. Therefore, in order to avoid placing requirements for a stable waste form on relatively innocuous waste, these wastes have been classed as Class A waste. The Class A waste will be disposed of in separate disposal units at the disposal site. However, Class A waste that is stable may be mixed with other classes of waste. Those higher activity wastes that should be stable for proper disposal are classed as Class B and C waste. To the extent that it is practicable, Class B and C waste forms or containers should be designed to be stable, i.e., maintain gross physical properties and identity, over 300 years. For certain radionuclides prone to migration, a maximum disposal site inventory based on the characteristics of the disposal site may be established to limit potential exposure.

(3) It is possible but unlikely that persons might occupy the site in the future and engage in normal pursuits without knowing that they were receiving radiation exposure. These persons are referred to as inadvertent intruders. Protection of such intruders can involve two principal controls: institutional control over the site after operations by the site owner to ensure that no such occupation or improper use of the site occurs; or, designating which waste could present an unacceptable risk to an intruder, and disposing of this waste in a manner that provides some form of intruder barrier that is intended to prevent contact with the waste. This regulation incorporates both types of protective controls.

(4) Institutional control of access to the site is required for up to 100 years. This permits the disposal of Class A and Class B waste without special provisions for intrusion protection, since these classes of waste contain types and quantities of radioisotopes that will decay during the 100-year period and will present an acceptable hazard to an intruder. The government landowner administering the active institutional control program has flexibility in controlling site access which may include allowing productive uses of the land provided the integrity and long-

term performance of the site are not affected.

(5) Waste that will not decay to levels which present an acceptable hazard to an intruder within 100 years is designated as Class C waste. This waste is disposed of at a greater depth than the other classes of waste so that subsequent surface activities by an intruder will not disturb the waste. Where site conditions prevent deeper disposal, intruder barriers such as concrete covers may be used. The effective life of these intruder barriers should be 500 years. A maximum concentration of radionuclides is specified for all wastes so that at the end of the 500 year period, remaining radioactivity will be at a level that does not pose an unacceptable hazard to an intruder or public health and safety. Waste with concentrations above these limits is generally unacceptable for near-surface disposal. There may be some instances where waste with concentrations greater than permitted for Class C would be acceptable for near-surface disposal with special processing or design. These will be evaluated on a case-by-case basis. Class C waste must also be stable.

(c) *The Licensing Process.* (1) During the preoperational phase, the potential applicant goes through a process of disposal site selection by selecting a region of interest, examining a number of possible disposal sites within the area of interest and narrowing the choice to the proposed site. Through a detailed investigation of the disposal site characteristics the potential applicant obtains data on which to base an analysis of the disposal site's suitability. Along with these data and analyses, the applicant submits other more general information to the Commission in the form of an application for a license for land disposal. The Commission's review of the application is in accordance with administrative procedures established by rule and may involve participation by affected State governments or Indian tribes. While the proposed disposal site must be owned by a State or the Federal government before the Commission will issue a license, it may be privately owned during the preoperational phase if suitable arrangements have been made with a State or the Federal government to take ownership in fee of the land before the license is issued.

(2) During the operational phase, the licensee carries out disposal activities in accordance with the requirements of this regulation and any conditions on the license. Periodically, the authority to conduct the above ground operations and dispose of waste will be subject to a

license renewal, at which time the operating history will be reviewed and a decision made to permit or deny continued operation. When disposal operations are to cease, the licensee applies for an amendment to his license to permit site closure. After final review of the licensee's site closure and stabilization plan, the Commission may approve the final activities necessary to prepare the disposal site so that ongoing active maintenance of the site is not required during the period of institutional control.

(3) During the period when the final site closure and stabilization activities are being carried out, the licensee is in a disposal site closure phase. Following that, for a period of 5 years, the licensee must remain at the disposal site for a period of post-closure observation and maintenance to assure that the disposal site is stable and ready for institutional control. The Commission may approve shorter or require longer periods if conditions warrant. At the end of this period, the licensee applies for a license transfer to the disposal site owner.

(4) After a finding of satisfactory disposal site closure, the Commission will transfer the license to the State or Federal government that owns the disposal site. If the Department of Energy is the Federal agency administering the land on behalf of the Federal government the license will be terminated because the Commission lacks regulatory authority over the Department for this activity. Under the conditions of the transferred license, the owner will carry out a program of monitoring to assure continued satisfactory disposal site performance, physical surveillance to restrict access to the site and carry out minor custodial activities. During this period, productive uses of the land might be permitted if those uses do not affect the stability of the site and its ability to meet the performance objectives. At the end of the prescribed period of institutional control, the license will be terminated by the Commission.

§ 61.8 Reporting, recordkeeping, and application requirements: OMB approval not required.

The information collection requirements contained in this part affect fewer than ten persons. Therefore, under section 3506(c)(5) of the Paperwork Reduction Act of 1980 (Pub. L. 96-511), OMB clearance is not required for these information collection requirements.

§ 61.9 Employee protection.

(a) Discrimination by a Commission licensee, an applicant for a Commission licensee, or a contractor or subcontractor of a Commission licensee or applicant against an employee for engaging in certain protected activities is prohibited. Discrimination includes discharge and other actions that relate to compensation, terms, conditions, and privileges of employment. The protected activities are established in Section 210 of the Energy Reorganization Act of 1974, as amended, and in general are related to the administration or enforcement of a requirement imposed under the Atomic Energy Act or the Energy Reorganization Act.

(1) The protected activities include but are not limited to—(i) Providing the Commission information about possible violations of requirements imposed under either of the above statutes;

(ii) Requesting the Commission to institute action against his or her employer for the administration or enforcement of these requirements; or
(iii) Testifying in any Commission proceeding.

(2) These activities are protected even if no formal proceeding is actually initiated as a result of the employee assistance or participation.

(3) This section has no application to any employee alleging discrimination prohibited by this section who, acting without direction from his or her employer (or the employer's agent), deliberately causes a violation of any requirement of the Energy Reorganization Act of 1974, as amended, or the Atomic Energy Act of 1954, as amended.

(b) Any employee who believes that he or she has been discharged or otherwise discriminated against by any person for engaging in the protected activities specified in paragraph (a)(1) of this section may seek a remedy for the discharge or discrimination through an administrative proceeding in the Department of Labor. The administrative proceeding must be initiated within 30 days after an alleged violation occurs by filing a complaint alleging the violation with the Department of Labor, Employment Standards Administration, Wage and Hour Division. The Department of Labor may order reinstatement, back pay, and compensatory damages.

(c) A violation of paragraph (a) of this section by a Commission licensee, an applicant for a Commission licensee, or a contractor or subcontractor of a Commission licensee or applicant may be grounds for—

(1) Denial, revocation, or suspension of the license.

(2) Imposition of a civil penalty on the licensee or applicant.

(3) Other enforcement action.

(d) Actions taken by an employer, or others, which adversely affect an employee may be predicated upon nondiscriminatory grounds. The prohibition applies when the adverse action occurs because the employee has engaged in protected activities. An employee's engagement in protected activities does not automatically render him or her immune from discharge or discipline for legitimate reasons or from adverse action dictated by non-prohibited considerations.

(e) Each licensee and each applicant shall post Form NRC-3, "Notice to Employees," on its premises. Posting must be at locations sufficient to permit employees protected by this section to observe a copy on the way to or from their place of work. Premises must be posted not later than 30 days after an application is docketed and remain posted while the application is pending before the Commission, during the term of the license, and for 30 days following license termination.

Note.—Copies of Form NRC-3 may be obtained by writing to the Regional Administrator of the appropriate U.S. Nuclear Regulatory Commission Regional Office listed in Appendix D, Part 20 of this chapter or the Director, Office of Inspection and Enforcement, U.S. Nuclear Regulatory Commission, Washington, D.C. 20555.

Subpart B—Licenses**§ 61.10 Content of application.**

An application to receive from others, possess and dispose of wastes containing or contaminated with source, byproduct or special nuclear material by land disposal must consist of general information, specific technical information, institutional information, and financial information as set forth in §§ 61.11 through 61.16. An environmental report prepared in accordance with Part 51 of this chapter must accompany the application.

§ 61.11 General information.

The general information must include each of the following:

(a) Identity of the applicant including:
(1) The full name, address, telephone number and description of the business or occupation of the applicant;

(2) If the applicant is a partnership, the name, and address of each partner and the principal location where the partnership does business;

(3) If the applicant is a corporation or an unincorporated association, (i) the state where it is incorporated or organized and the principal location where it does business, and (ii) the

names and addresses of its directors and principal officers; and

(4) If the applicant is acting as an agent or representative of another person in filing the application, all information required under this paragraph must be supplied with respect to the other person.

(b) Qualifications of the applicant:

(1) The organizational structure of the applicant, both offsite and onsite, including a description of lines of authority and assignments of responsibilities, whether in the form of administrative directives, contract provisions, or otherwise;

(2) The technical qualifications, including training and experience, of the applicant and members of the applicant's staff to engage in the proposed activities. Minimum training and experience requirements for personnel filling key positions described in Paragraph 61.11(b)(1) must be provided;

(3) A description of the applicant's personnel training program; and

(4) The plan to maintain an adequate complement of trained personnel to carry out waste receipt, handling, and disposal operations in a safe manner

(c) A description of:

(1) The location of the proposed disposal site;

(2) The general character of the proposed activities;

(3) The types and quantities of radioactive waste to be received, possessed, and disposed of;

(4) Plans for use of the land disposal facility for purposes other than disposal of radioactive wastes; and

(5) The proposed facilities and equipment.

(d) Proposed schedules for construction, receipt of waste, and first emplacement of waste at the proposed land disposal facility.

§ 61.12 Specific technical information.

The specific technical information must include the following information needed for demonstration that the performance objectives of Subpart C of this part and the applicable technical requirements of Subpart D of this part will be met:

(a) A description of the natural and demographic disposal site characteristics as determined by disposal site selection and characterization activities. The description must include geologic, geotechnical, hydrologic, meteorologic, climatologic, and biotic features of the disposal site and vicinity.

(b) A description of the design features of the land disposal facility and

the disposal units. For near-surface disposal, the description must include those design features related to infiltration of water; integrity of covers for disposal units; structural stability of backfill, wastes, and covers; contact of wastes with standing water; disposal site drainage; disposal site closure and stabilization; elimination to the extent practicable of long-term disposal site maintenance; inadvertent intrusion; occupational exposures; disposal site monitoring; and adequacy of the size of the buffer zone for monitoring and potential mitigative measures.

(c) A description of the principal design criteria and their relationship to the performance objectives.

(d) A description of the design basis natural events or phenomena and their relationship to the principal design criteria.

(e) A description of codes and standards which the applicant has applied to the design and which will apply to construction of the land disposal facilities.

(f) A description of the construction and operation of the land disposal facility. The description must include as a minimum the methods of construction of disposal units; waste emplacement; the procedures for and areas of waste segregation; types of intruder barriers; onsite traffic and drainage systems; survey control program; methods and areas of waste storage; and methods to control surface water and groundwater access to the wastes. The description must also include a description of the methods to be employed in the handling and disposal of wastes containing chelating agents or other non-radiological substances that might affect meeting the performance objectives in Subpart C of this part.

(g) A description of the disposal site closure plan, including those design features which are intended to facilitate disposal site closure and to eliminate the need for ongoing active maintenance.

(h) An identification of the known natural resources at the disposal site, the exploitation of which could result in inadvertent intrusion into the low-level wastes after removal of active institutional control.

(i) A description of the kind, amount, classification and specifications of the radioactive material proposed to be received, possessed, and disposed of at the land disposal facility.

(j) A description of the quality control program for the determination of natural disposal site characteristics and for quality control during the design, construction, operation and closure of the land disposal facility and the

receipt, handling, and emplacement of waste. Audits and managerial controls must be included.

(k) A description of the radiation safety program for control and monitoring of radioactive effluents to ensure compliance with the performance objective in § 61.41 of this part and occupational radiation exposure to ensure compliance with the requirements of Part 20 of this chapter and to control contamination of personnel, vehicles, equipment, buildings, and the disposal site. Both routine operations and accidents must be addressed. The program description must include procedures, instrumentation, facilities, and equipment.

(l) A description of the environmental monitoring program to provide data to evaluate potential health and environmental impacts and the plan for taking corrective measures if migration of radionuclides is indicated.

(m) A description of the administrative procedures that the applicant will apply to control activities at the land disposal facility.

§ 61.13 Technical analyses.

The specific technical information must also include the following analyses needed to demonstrate that the performance objectives of Subpart C of this part will be met:

(a) Pathways analyzed in demonstrating protection of the general population from releases of radioactivity must include air, soil, groundwater, surface water, plant uptake, and exhumation by burrowing animals. The analyses must clearly identify and differentiate between the roles performed by the natural disposal site characteristics and design features in isolating and segregating the wastes. The analyses must clearly demonstrate that there is reasonable assurance that the exposure to humans from the release of radioactivity will not exceed the limits set forth in § 61.41.

(b) Analyses of the protection of individuals from inadvertent intrusion must include demonstration that there is reasonable assurance the waste classification and segregation requirements will be met and that adequate barriers to inadvertent intrusion will be provided.

(c) Analyses of the protection of individuals during operations must include assessments of expected exposures due to routine operations and likely accidents during handling, storage, and disposal of waste. The analyses must provide reasonable assurance that exposures will be

controlled to meet the requirements of Part 20 of this chapter.

(d) Analyses of the long-term stability of the disposal site and the need for ongoing active maintenance after closure must be based upon analyses of active natural processes such as erosion, mass wasting, slope failure, settlement of wastes and backfill, infiltration through covers over disposal areas and adjacent soils, and surface drainage of the disposal site. The analyses must provide reasonable assurance that there will not be a need for ongoing active maintenance of the disposal site following closure.

§ 61.14 Institutional information.

The institutional information must include:

(a) A certification by the Federal or State government which owns the disposal site that the Federal or State government is prepared to accept transfer of the license when the provisions of § 61.30 are met, and will assume responsibility for custodial care after site closure and postclosure observation and maintenance.

(b) Where the proposed disposal site is on land not owned by the Federal or a State government, the applicant must submit evidence that arrangements have been made for assumption of ownership in fee by the Federal or a State government before the Commission issues a license.

§ 61.15 Financial information.

The financial information must be sufficient to demonstrate that the financial qualifications of the applicant are adequate to carry out the activities for which the license is sought and meet other financial assurance requirements as specified in Subpart E of this part.

§ 61.16 Other information.

Depending upon the nature of the wastes to be disposed of, and the design and proposed operation of the land disposal facility, additional information may be requested by the Commission including the following:

(a) Physical security measures, if appropriate. Any application to receive and possess special nuclear material in quantities subject to the requirements of Part 73 of this chapter shall demonstrate how the physical security requirements of Part 73 will be met. In determining whether receipt and possession will be subject to the requirements of Part 73, the applicant shall not consider the quantity of special nuclear material that has been disposed of.

(b) Safety information concerning criticality, if appropriate.

(1) Any application to receive and possess special nuclear material in quantities that would be subject to the requirements of § 70.24, "Criticality accident requirements" of Part 70 of this chapter shall demonstrate how the requirements of that section will be met, unless the applicant requests an exemption pursuant to § 70.24(d). In determining whether receipt and possession would be subject to the requirements of § 70.24, the applicant shall not consider the quantity of special nuclear material that has been disposed of.

(2) Any application to receive and possess special nuclear material shall describe proposed procedures for avoiding accidental criticality, which address both storage of special nuclear material prior to disposal and waste emplacement for disposal.

§ 61.20 Filing and distribution of application.

(a) An application for a license under this part, and any amendments thereto, shall be filed with the Director, must be signed by the applicant or the applicant's authorized representative under oath, and must consist of 1 signed original and 2 copies.

(b) Another 85 copies of the application and environmental report must be retained by the applicant for distribution in accordance with written instructions from the Director or designee.

(c) Fees. Application, amendment, and inspection fees applicable to a license covering the receipt and disposal of radioactive wastes in a land disposal facility are required by Part 170 of this chapter.

§ 61.21 Elimination of repetition.

In its application or environmental report, the applicant may incorporate by reference information contained in previous applications, statements, or reports filed with the Commission if these references are clear and specific.

§ 61.22 Updating of application and environmental report.

(a) The application and environmental report must be as complete as possible in the light of information that is available at the time of submittal.

(b) The applicant shall supplement its application or environmental report in a timely manner, as necessary, to permit the Commission to review, prior to issuance of a license, any changes in the activities proposed to be carried out or new information regarding the proposed activities.

§ 61.23 Standards for issuance of a license.

A license for the receipt, possession, and disposal of waste containing or contaminated with source, special nuclear, or byproduct material will be issued by the Commission upon finding that the issuance of the license will not be inimical to the common defense and security and will not constitute an unreasonable risk to the health and safety of the public, and:

(a) The applicant is qualified by reason of training and experience to carry out the disposal operations requested in a manner that protects health and minimizes danger to life or property.

(b) The applicant's proposed disposal site, disposal design, land disposal facility operations (including equipment, facilities, and procedures), disposal site closure, and postclosure institutional control are adequate to protect the public health and safety in that they provide reasonable assurance that the general population will be protected from releases of radioactivity as specified in the performance objective in § 61.41, Protection of the general population from releases of radioactivity.

(c) The applicant's proposed disposal site, disposal site design, land disposal facility operations (including equipment, facilities, and procedures), disposal site closure, and postclosure institutional control are adequate to protect the public health and safety in that they will provide reasonable assurance that individual inadvertent intruders are protected in accordance with the performance objective in § 61.42, Protection of individuals from inadvertent intrusion.

(d) The applicant's proposed land disposal facility operations, including equipment, facilities, and procedures, are adequate to protect the public health and safety in that they will provide reasonable assurance that the standards for radiation protection set out in Part 20 of this chapter will be met.

(e) The applicant's proposed disposal site, disposal site design, land disposal facility operations, disposal site closure, and postclosure institutional control are adequate to protect the public health and safety in that they will provide reasonable assurance that long-term stability of the disposed waste and the disposal site will be achieved and will eliminate to the extent practicable the need for ongoing active maintenance of the disposal site following closure.

(f) The applicant's demonstration provides reasonable assurance that the applicable technical requirements of Subpart D of this part will be met.

(g) The applicant's proposal for institutional control provides reasonable assurance that institutional control will be provided for the length of time found necessary to ensure the findings in paragraphs (b)-(e) of this section and that the institutional control meets the requirements of § 61.59, Institutional requirements.

(h) The information on financial assurances meets the requirements of Subpart E of this part.

(i) The applicant's physical security information provides reasonable assurance that the requirements of Part 73 of this chapter will be met, insofar as they are applicable to special nuclear material to be possessed before disposal under the license.

(j) The applicant's criticality safety procedures are adequate to protect the public health and safety and provide reasonable assurance that the requirements of § 70.24, Criticality accident requirements, of Part 70 of this chapter will be met, insofar as they are applicable to special nuclear material to be possessed before disposal under the license.

(k) Any additional information submitted as requested by the Commission pursuant to § 61.18, Other information, is adequate.

(l) The requirements of Part 51 of this chapter have been met.

§ 61.24 Conditions of licenses.

(a) A license issued under this part, or any right thereunder, may be transferred, assigned, or in any manner disposed of, either voluntarily or involuntarily, directly or indirectly, through transfer of control of the license to any person, only if the Commission finds, after securing full information, that the transfer is in accordance with the provisions of the Atomic Energy Act and gives its consent in writing in the form of a license amendment.

(b) The licensee shall submit written statements under oath upon request of the Commission, at any time before termination of the license, to enable the Commission to determine whether or not the license should be modified, suspended, or revoked.

(c) The license will be transferred to the site owner only on the full implementation of the final closure plan as approved by the Commission, including postclosure observation and maintenance.

(d) The licensee shall be subject to the provisions of the Atomic Energy Act now or hereafter in effect, and to all rules, regulations, and orders of the Commission. The terms and conditions of the license are subject to amendment,

revision, or modification, by reason of amendments to, or by reason of rules, regulations and orders issued in accordance with the terms of the Atomic Energy Act.

(e) Any license may be revoked, suspended or modified in whole or in part for any material false statement in the application or any statement of fact required under Section 182 of the Act, or because of conditions revealed by any application or statement of fact or any report, record, or inspection or other means which would warrant the Commission to refuse to grant a license to the original application, or for failure to operate the facility in accordance with the terms of the license, or for any violation of, or failure to observe any of the terms and conditions of the Act, or any rule, regulation, license or order of the Commission.

(f) Each person licensed by the Commission pursuant to the regulations in this part shall confine possession and use of materials to the locations and purposes authorized in the license.

(g) No radioactive waste may be disposed of until the Commission has inspected the land disposal facility and has found it to be in conformance with the description, design, and construction described in the application for a license.

(h) The Commission may incorporate in any license at the time of issuance, or thereafter, by appropriate rule, regulation or order, additional requirements and conditions with respect to the licensee's receipt, possession, and disposal of source, special nuclear or byproduct material as it deems appropriate or necessary in order to:

(1) Promote the common defense and security;

(2) Protect health or to minimize danger to life or property;

(3) Require reports and the keeping of records, and to provide for inspections of activities under the license that may be necessary or appropriate to effectuate the purposes of the Act and regulations thereunder

(i) Any licensee who receives and possesses special nuclear material under this part in quantities that would be subject to the requirements of § 70.24 of Part 70 of this chapter shall comply with the requirements of that section. The licensee shall not consider the quantity of special nuclear material that has been disposed of.

(j) The authority to dispose of wastes expires on the date stated in the license except as provided in § 61.27(a) of this part.

§ 61.25 Changes.

(a) Except as provided for in specific license conditions, the licensee shall not make changes in the land disposal facility or procedures described in the license application. The license will include conditions restricting subsequent changes to the facility and the procedures authorized which are important to public health and safety. These license restrictions will fall into three categories of descending importance to public health and safety as follows: (1) those features and procedures which may not be changed without (i) 60 days prior notice to the Commission, (ii) 30 days notice of opportunity for a prior hearing, and (iii) prior Commission approval; (2) those features and procedures which may not be changed without (i) 60 days prior notice to the Commission, and (ii) prior Commission approval; and (3) those features and procedures which may not be changed without 60 days prior notice to the Commission. Features and procedures falling in paragraph (a)(3) of this section may not be changed without prior Commission approval if the Commission, after having received the required notice, so orders.

(b) Amendments authorizing site closure, license transfer, or license termination shall be included in paragraph (a)(1) of this section.

(c) The Commission shall provide a copy of the notice for opportunity for hearings provided in paragraph (a)(1) of this section to State and local officials or tribal governing bodies specified in § 2.104(e) of Part 2 of this chapter.

§ 61.26 Amendment of license.

(a) An application for amendment of a license must be filed in accordance with § 61.20 and shall fully describe the changes desired.

(b) In determining whether an amendment to a license will be approved, the Commission will apply the criteria set forth in § 61.23.

§ 61.27 Application for renewal or closure.

(a) Any expiration date on a license applies only to the above ground activities and to the authority to dispose of waste. Failure to renew the license shall not relieve the licensee of responsibility for carrying out site closure, postclosure observation and transfer of the license to the site owner. An application for renewal or an application for closure under § 61.28 must be filed at least 30 days prior to license expiration.

(b) Applications for renewal of a license must be filed in accordance with §§ 61.10 through 61.16 and § 61.20. Applications for closure must be filed in

accordance with §§ 61.20 and 61.28. Information contained in previous applications, statements or reports filed with the Commission under the license may be incorporated by reference if the references are clear and specific.

(c) In any case in which a licensee has timely filed an application for renewal of a license, the license for continued receipt and disposal of licensed materials does not expire until the Commission has taken final action on the application for renewal.

(d) In determining whether a license will be renewed, the Commission will apply the criteria set forth in § 61.23.

§ 61.28 Contents of application for closure.

(a) Prior to final closure of the disposal site, or as otherwise directed by the Commission, the applicant shall submit an application to amend the license for closure. This closure application must include a final revision and specific details of the disposal site closure plan included as part of the license application submitted under § 61.12(g) that includes each of the following:

(1) Any additional geologic, hydrologic, or other disposal site data pertinent to the long-term containment of emplaced radioactive wastes obtained during the operational period.

(2) The results of tests, experiments, or other analyses relating to backfill of excavated areas, closure and sealing, waste migration and interaction with emplacement media, or any other tests, experiments, or analysis pertinent to the long-term containment of emplaced waste within the disposal site.

(3) Any proposed revision of plans for: (i) Decontamination and/or dismantlement of surface facilities; (ii) Backfilling of excavated areas; or (iii) Stabilization of the disposal site for post-closure care.

(4) Any significant new information regarding the environmental impact of closure activities and long-term performance of the disposal site.

(b) Upon review and consideration of an application to amend the license for closure submitted in accordance with paragraph (a) of this section, the Commission shall issue an amendment authorizing closure if there is reasonable assurance that the long-term performance objectives of Subpart C of this part will be met.

§ 61.29 Post-closure observation and maintenance.

Following completion of closure authorized in § 61.28, the licensee shall observe, monitor, and carry out

necessary maintenance and repairs at the disposal site until the license is transferred by the Commission in accordance with § 61.30. Responsibility for the disposal site must be maintained by the licensee for 5 years. A shorter or longer time period for post-closure observation and maintenance may be established and approved as part of the site closure plan, based on site-specific conditions.

§ 61.30 Transfer of license.

(a) Following closure and the period of post-closure observation and maintenance, the licensee may apply for an amendment to transfer the license to the disposal site owner. The license shall be transferred when the Commission finds:

(1) That the closure of the disposal site has been made in conformance with the licensee's disposal site closure plan, as amended and approved as part of the license;

(2) That reasonable assurance has been provided by the licensee that the performance objectives of Subpart C of this part are met;

(3) That any funds and necessary records for care will be transferred to the disposal site owner;

(4) That the post-closure monitoring program is operational for implementation by the disposal site owner; and

(5) That the Federal or State government agency which will assume responsibility for institutional control of the disposal site is prepared to assume responsibility and ensure that the institutional requirements found necessary under § 61.23(g) will be met.

(b) [Reserved]

§ 61.31 Termination of license.

(a) Following any period of institutional control needed to meet the requirements found necessary under § 61.23, the licensee may apply for an amendment to terminate the license.

(b) This application must be filed, and will be reviewed, in accordance with the provision of § 61.20 and of this section.

(c) A license is terminated only when the Commission finds:

(1) That the institutional control requirements found necessary under § 61.23(g) have been met; and

(2) That any additional requirements resulting from new information developed during the institutional control period have been met, and that permanent monuments or markers warning against intrusion have been installed.

Subpart C—Performance Objectives

§ 61.40 General requirement.

Land disposal facilities must be sited, designed, operated, closed, and controlled after closure so that reasonable assurance exists that exposures to humans are within the limits established in the performance objectives in §§ 61.41 through 61.44.

§ 61.41 Protection of the general population from releases of radioactivity.

Concentrations of radioactive material which may be released to the general environment in ground water, surface water, air, soil, plants, or animals must not result in an annual dose exceeding an equivalent of 25 millirems to the whole body, 75 millirems to the thyroid, and 25 millirems to any other organ of any member of the public. Reasonable effort should be made to maintain releases of radioactivity in effluents to the general environment as low as is reasonably achievable.

§ 61.42 Protection of individuals from inadvertent intrusion.

Design, operation, and closure of the land disposal facility must ensure protection of any individual inadvertently intruding into the disposal site and occupying the site or contacting the waste at any time after active institutional controls over the disposal site are removed.

§ 61.43 Protection of individuals during operations.

Operations at the land disposal facility must be conducted in compliance with the standards for radiation protection set out in Part 20 of this chapter, except for releases of radioactivity in effluents from the land disposal facility, which shall be governed by § 61.41 of this part. Every reasonable effort shall be made to maintain radiation exposures as low as is reasonably achievable.

§ 61.44 Stability of the disposal site after closure.

The disposal facility must be sited, designed, used, operated, and closed to achieve long-term stability of the disposal site and to eliminate to the extent practicable the need for ongoing active maintenance of the disposal site following closure so that only surveillance, monitoring, or minor custodial care are required.

Subpart D—Technical Requirements for Land Disposal Facilities

§ 61.50 Disposal site suitability requirements for land disposal.

(a) Disposal site suitability for near-surface disposal.

(1) The purpose of this section is to specify the minimum characteristics a disposal site must have to be acceptable for use as a near-surface disposal facility. The primary emphasis in disposal site suitability is given to isolation of wastes, a matter having long-term impacts, and to disposal site features that ensure that the long-term performance objectives of Subpart C of this part are met, as opposed to short-term convenience or benefits.

(2) The disposal site shall be capable of being characterized, modeled, analyzed and monitored.

(3) Within the region or state where the facility is to be located, a disposal site should be selected so that projected population growth and future developments are not likely to affect the ability of the disposal facility to meet the performance objectives of Subpart C of this part.

(4) Areas must be avoided having known natural resources which, if exploited, would result in failure to meet the performance objectives of Subpart C of this part.

(5) The disposal site must be generally well drained and free of areas of flooding or frequent ponding. Waste disposal shall not take place in a 100-year flood plain, coastal high-hazard area or wetland, as defined in Executive Order 11988, "Floodplain Management Guidelines."

(6) Upstream drainage areas must be minimized to decrease the amount of runoff which could erode or inundate waste disposal units.

(7) The disposal site must provide sufficient depth to the water table that ground water intrusion, perennial or otherwise, into the waste will not occur. The Commission will consider an exception to this requirement to allow disposal below the water table if it can be conclusively shown that disposal site characteristics will result in molecular diffusion being the predominant means of radionuclide movement and the rate of movement will result in the performance objectives of Subpart C of this part being met. In no case will waste disposal be permitted in the zone of fluctuation of the water table.

(8) The hydrogeologic unit used for disposal shall not discharge ground water to the surface within the disposal site.

(9) Areas must be avoided where tectonic processes such as faulting, folding, seismic activity, or vulcanism may occur with such frequency and extent to significantly affect the ability of the disposal site to meet the performance objectives of Subpart C of this part, or may preclude defensible modeling and prediction of long-term impacts.

(10) Areas must be avoided where surface geologic processes such as mass wasting, erosion, slumping, landsliding, or weathering occur with such frequency and extent to significantly affect the ability of the disposal site to meet the performance objectives of Subpart C of this part, or may preclude defensible modeling and prediction of long-term impacts.

(11) The disposal site must not be located where nearby facilities or activities could adversely impact the ability of the site to meet the performance objectives of Subpart C of this part or significantly mask the environmental monitoring program.

(b) Disposal site suitability requirements for land disposal other than near-surface (reserved).

§ 61.51 Disposal site design for land disposal.

(a) Disposal site design for near-surface disposal.

(1) Site design features must be directed toward long-term isolation and avoidance of the need for continuing active maintenance after site closure.

(2) The disposal site design and operation must be compatible with the disposal site closure and stabilization plan and lead to disposal site closure that provides reasonable assurance that the performance objectives of Subpart C of this part will be met.

(3) The disposal site must be designed to complement and improve, where appropriate, the ability of the disposal site's natural characteristics to assure that the performance objectives of Subpart C of this part will be met.

(4) Covers must be designed to minimize to the extent practicable water infiltration, to direct percolating or surface water away from the disposed waste, and to resist degradation by surface geologic processes and biotic activity.

(5) Surface features must direct surface water drainage away from disposal units at velocities and gradients which will not result in erosion that will require ongoing active maintenance in the future.

(6) The disposal site must be designed to minimize to the extent practicable the contact of water with waste during storage, the contact of standing water

with waste during disposal, and the contact of percolating or standing water with wastes after disposal.

(b) Disposal site design for other than near-surface disposal (reserved).

§ 61.52 Land disposal facility operation and disposal site closure.

(a) Near-surface disposal facility operation and disposal site closure.

(1) Wastes designated as Class A pursuant to § 61.55, must be segregated from other wastes by placing in disposal units which are sufficiently separated from disposal units for the other waste classes so that any interaction between Class A wastes and other wastes will not result in the failure to meet the performance objectives in Subpart C of this Part. This segregation is not necessary for Class A wastes if they meet the stability requirements in § 61.56(b) of this part.

(2) Wastes designated as Class C pursuant to § 61.55, must be disposed of so that the top of the waste is a minimum of 5 meters below the top surface of the cover or must be disposed of with intruder barriers that are designed to protect against an inadvertent intrusion for a least 500 years.

(3) All wastes shall be disposed of in accordance with the requirements of paragraphs (a)(4) through (11) of this section.

(4) Wastes must be emplaced in a manner that maintains the package integrity during emplacement, minimizes the void spaces between packages, and permits the void spaces to be filled.

(5) Void spaces between waste packages must be filled with earth or other material to reduce future subsidence within the fill.

(6) Waste must be placed and covered in a manner that limits the radiation dose rate at the surface of the cover to levels that at a minimum will permit the licensee to comply with all provisions of § 20.105 of this chapter at the time the license is transferred pursuant to § 61.30 of this part.

(7) The boundaries and locations of each disposal unit (e.g., trenches) must be accurately located and mapped by means of a land survey. Near-surface disposal units must be marked in such a way that the boundaries of each unit can be easily defined. Three permanent survey marker control points, referenced to United States Geological Survey (USGS) or National Geodetic Survey (NGS) survey control stations, must be established on the site to facilitate surveys. The USGS or NGS control stations must provide horizontal and vertical controls as checked against USGSD or NGS record files.

(8) A buffer zone of land must be maintained between any buried waste and the disposal site boundary and beneath the disposed waste. The buffer zone shall be of adequate dimensions to carry out environmental monitoring activities specified in § 61.53(d) of this part and take mitigative measures if needed.

(9) Closure and stabilization measures as set forth in the approved site closure plan must be carried out as each disposal unit (e.g., each trench) is filled and covered.

(10) Active waste disposal operations must not have an adverse effect on completed closure and stabilization measures.

(11) Only wastes containing or contaminated with radioactive materials shall be disposed of at the disposal site.

(b) Facility operation and disposal site closure for land disposal facilities other than near-surface (reserved).

§ 61.53 Environmental monitoring.

(a) At the time a license application is submitted, the applicant shall have conducted a preoperational monitoring program to provide basic environmental data on the disposal site characteristics. The applicant shall obtain information about the ecology, meteorology, climate, hydrology, geology, geochemistry, and seismology of the disposal site. For those characteristics that are subject to seasonal variation, data must cover at least a twelve month period.

(b) The licensee must have plans for taking corrective measures if migration of radionuclides would indicate that the performance objectives of Subpart C may not be met.

(c) During the land disposal facility site construction and operation, the licensee shall maintain a monitoring program. Measurements and observations must be made and recorded to provide data to evaluate the potential health and environmental impacts during both the construction and the operation of the facility and to enable the evaluation of long-term effects and the need for mitigative measures. The monitoring system must be capable of providing early warning of releases of radionuclides from the disposal site before they leave the site boundary.

(d) After the disposal site is closed, the licensee responsible for post-operational surveillance of the disposal site shall maintain a monitoring system based on the operating history and the closure and stabilization of the disposal site. The monitoring system must be capable of providing early warning of releases of radionuclides from the

disposal site before they leave the site boundary.

§ 61.54 Alternative requirements for design and operations.

The Commission may, upon request or on its own initiative, authorize provisions other than those set forth in §§ 61.51 through 61.53 for the segregation and disposal of waste and for the design and operation of a land disposal facility on a specific basis, if it finds reasonable assurance of compliance with the performance objectives of Subpart C of this part.

§ 61.55 Waste classification.

(a) Classification of waste for near surface disposal.

(1) *Considerations.* Determination of the classification of radioactive waste involves two considerations. First, consideration must be given to the concentration of long-lived radionuclides (and their shorter-lived precursors) whose potential hazard will persist long after such precautions as institutional controls, improved waste form, and deeper disposal have ceased to be effective. These precautions delay the time when long-lived radionuclides could cause exposures. In addition, the magnitude of the potential dose is limited by the concentration and availability of the radionuclide at the time of exposure. Second, consideration must be given to the concentration of shorter-lived radionuclides for which requirements on institutional controls, waste form, and disposal methods are effective.

(2) *Classes of waste.* (i) Class A waste is waste that is usually segregated from other waste classes at the disposal site. The physical form and characteristics of Class A waste must meet the minimum requirements set forth in § 61.56(a). If Class A waste also meets the stability requirements set forth in § 61.56(b), it is not necessary to segregate the waste for disposal.

(ii) Class B waste is waste that must meet more rigorous requirements on waste form to ensure stability after disposal. The physical form and characteristics of Class B waste must meet both the minimum and stability requirements set forth in § 61.56.

(iii) Class C waste is waste that not only must meet more rigorous requirements on waste form to ensure stability but also requires additional measures at the disposal facility to protect against inadvertent intrusion. The physical form and characteristics of Class C waste must meet both the minimum and stability requirements set forth in § 61.56.

(iv) Waste that is not generally acceptable for near-surface disposal is waste for which waste form and disposal methods must be different, and in general more stringent, than those specified for Class C waste. In the absence of specific requirements in this part, proposals for disposal of this waste may be submitted to the Commission for approval, pursuant to § 61.58 of this part.

(3) Classification determined by long-lived radionuclides. If radioactive waste contains only radionuclides listed in Table 1, classification shall be determined as follows:

(i) If the concentration does not exceed 0.1 times the value in Table 1, the waste is Class A.

(ii) If the concentration exceeds 0.1 times the value in Table 1 but does not exceed the value in Table 1, the waste is Class C.

(iii) If the concentration exceeds the value in Table 1, the waste is not generally acceptable for near-surface disposal.

(iv) For wastes containing mixtures of radionuclides listed in Table 1, the total concentration shall be determined by the sum of fractions rule described in paragraph (a)(7) of this section.

TABLE 1

Radionuclide	Concentration curies per cubic meter
C-14	8
C-14 in activated metal	80
Ni-59 in activated metal	220
Nb-94 in activated metal	0.2
Tc-99	3
I-129	0.08
Alpha emitting transuranic nuclides with half-life greater than five years	1100
Pu-241	13,500
Cm-242	20,000

¹ Units are nanocuries per gram.

(4) Classification determined by short-lived radionuclides. If radioactive waste does not contain any of the radionuclides listed in Table 1, classification shall be determined based on the concentrations shown in Table 2. However, as specified in paragraph (a)(6) of this section, if radioactive waste does not contain any nuclides listed in either Table 1 or 2, it is Class A.

(i) If the concentration does not exceed the value in Column 1, the waste is Class A.

(ii) If the concentration exceeds the value in Column 1, but does not exceed the value in Column 2, the waste is Class B.

(iii) If the concentration exceeds the value in Column 2, but does not exceed the value in Column 3, the waste is Class C.

(iv) If the concentration exceeds the value in Column 3, the waste is not generally acceptable for near-surface disposal.

(v) For wastes containing mixtures of the nuclides listed in Table 2, the total concentration shall be determined by the sum of fractions rule described in paragraph (a)(7) of this section.

TABLE 2

Radionuclide	Concentration, curies per cubic meter		
	Col. 1	Col. 2	Col. 3
Total of all nuclides with less than 5 year half life	700	(1)	(1)
H-3	40	(1)	(1)
Co-60	700	(1)	(1)
Ni-63	3.5	70	700
Ni-63 in activated metal	35	700	7000
Sr-90	0.04	150	7000
Cs-137	1	44	4400

¹ There are no limits established for these radionuclides in Class B or C wastes. Practical considerations such as the effects of external radiation and internal heat generation on transportation, handling, and disposal will limit the concentrations for these wastes. These wastes shall be Class B unless the concentrations of other nuclides in Table 2 determine the waste to be the Class C independent of these nuclides.

(5) Classification determined by both long- and short-lived radionuclides. If radioactive waste contains a mixture of radionuclides, some of which are listed in Table 1, and some of which are listed in Table 2, classification shall be determined as follows:

(i) If the concentration of a nuclide listed in Table 1 does not exceed 0.1 times the value listed in Table 1, the class shall be that determined by the concentration of nuclides listed in Table 2.

(ii) If the concentration of a nuclide listed in Table 1 exceeds 0.1 times the value listed in Table 1 but does not exceed the value in Table 1, the waste shall be Class C, provided the concentration of nuclides listed in Table 2 does not exceed the value shown in Column 3 of Table 2.

(6) Classification of wastes with radionuclides other than those listed in Tables 1 and 2. If radioactive waste does not contain any nuclides listed in either Table 1 or 2, it is Class A.

(7) The sum of the fractions rule for mixtures of radionuclides. For determining classification for waste that contains a mixture of radionuclides, it is necessary to determine the sum of fractions by dividing each nuclide's concentration by the appropriate limit and adding the resulting values. The appropriate limits must all be taken from the same column of the same table. The sum of the fractions for the column must be less than 1.0 if the waste class is to be determined by that column. Example: A waste contains Sr-90 in a

concentration of 50 Ci/m³ and Cs-137 in a concentration of 22 Ci/m³. Since the concentrations both exceed the values in Column 1, Table 2, they must be compared to Column 2 values. For Sr-90 fraction 50/150=0.33; for Cs-137 fraction, 22/44=0.5; the sum of the fractions=0.83. Since the sum is less than 1.0, the waste is Class B.

(8) *Determination of concentrations in wastes.* The concentration of a radionuclide may be determined by indirect methods such as use of scaling factors which relate the inferred concentration of one radionuclide to another that is measured, or radionuclide material accountability, if there is reasonable assurance that the indirect methods can be correlated with actual measurements. The concentration of a radionuclide may be averaged over the volume of the waste, or weight of the waste if the units are expressed as nanocuries per gram.

§ 61.56 Waste characteristics.

(a) The following requirements are minimum requirements for all classes of waste and are intended to facilitate handling at the disposal site and provide protection of health and safety of personnel at the disposal site.

(1) Waste must not be packaged for disposal in cardboard or fiberboard boxes.

(2) Liquid waste must be solidified or packaged in sufficient absorbent material to absorb twice the volume of the liquid.

(3) Solid waste containing liquid shall contain as little free standing and noncorrosive liquid as is reasonably achievable, but in no case shall the liquid exceed 1% of the volume.

(4) Waste must not be readily capable of detonation or of explosive decomposition or reaction at normal pressures and temperatures, or of explosive reaction with water.

(5) Waste must not contain, or be capable of generating, quantities of toxic gases, vapors, or fumes harmful to persons transporting, handling, or disposing of the waste. This does not apply to radioactive gaseous waste packaged in accordance with paragraph (a)(7) of this section.

(6) Waste must not be pyrophoric. Pyrophoric materials contained in waste shall be treated, prepared, and packaged to be nonflammable.

(7) Waste in a gaseous form must be packaged at a pressure that does not exceed 1.5 atmospheres at 20°C. Total activity must not exceed 100 curies per container.

(8) Waste containing hazardous, biological, pathogenic, or infectious material must be treated to reduce to the

maximum extent practicable the potential hazard from the non-radiological materials.

(b) The requirements in this section are intended to provide stability of the waste. Stability is intended to ensure that the waste does not structurally degrade and affect overall stability of the site through slumping, collapse, or other failure of the disposal unit and thereby lead to water infiltration. Stability is also a factor in limiting exposure to an inadvertent intruder, since it provides a recognizable and nondispersible waste.

(1) Waste must have structural stability. A structurally stable waste form will generally maintain its physical dimensions and its form, under the expected disposal conditions such as weight of overburden and compaction equipment, the presence of moisture, and microbial activity, and internal factors such as radiation effects and chemical changes. Structural stability can be provided by the waste form itself, processing the waste to a stable form, or placing the waste in a disposal container or structure that provides stability after disposal.

(2) Notwithstanding the provisions in §§ 61.56(a) (2) and (3), liquid wastes, or wastes containing liquid, must be converted into a form that contains as little free standing and noncorrosive liquid as is reasonably achievable, but in no case shall the liquid exceed 1% of the volume of the waste when the waste is in a disposal container designed to ensure stability, or 0.5% of the volume of the waste for waste processed to a stable form.

(3) Void spaces within the waste and between the waste and its package must be reduced to the extent practicable.

§ 61.57 Labeling.

Each package of waste must be clearly labeled to identify whether it is Class A waste, Class B waste, or class C waste in accordance with § 61.55.

§ 61.58 Alternative requirements for waste classification and characteristics.

The Commission may, upon request or on its own initiative, authorize other provisions for the classification and characteristics of waste on a specific basis, if, after evaluation, of the specific characteristics of the waste, disposal site, and method of disposal, it finds reasonable assurance of compliance with the performance objectives in Subpart C of this part.

§ 61.59 Institutional requirements.

(a) *Land ownership.* Disposal of radioactive waste received from other persons may be permitted only on land

owned in fee by the Federal or a State government.

(b) *Institutional control.* The land owner or custodial agency shall carry out an institutional control program to physically control access to the disposal site following transfer of control of the disposal site from the disposal site operator. The institutional control program must also include, but not be limited to, carrying out an environmental monitoring program at the disposal site, periodic surveillance, minor custodial care, and other requirements as determined by the Commission; and administration of funds to cover the costs for these activities. The period of institutional controls will be determined by the Commission, but institutional controls may not be relied upon for more than 100 years following transfer of control of the disposal site to the owner.

Subpart E—Financial Assurances

§ 61.61 Applicant qualifications and assurances.

Each applicant shall show that it either possesses the necessary funds or has reasonable assurance of obtaining the necessary funds, or by a combination of the two, to cover the estimated costs of conducting all licensed activities over the planned operating life of the project, including costs of construction and disposal.

§ 61.62 Funding for disposal site closure and stabilization.

(a) The applicant shall provide assurance that sufficient funds will be available to carry out disposal site closure and stabilization, including: (1) Decontamination or dismantlement of land disposal facility structures; and (2) closure and stabilization of the disposal site so that following transfer of the disposal site to the site owner, the need for ongoing active maintenance is eliminated to the extent practicable and only minor custodial care, surveillance, and monitoring are required. These assurances shall be based on Commission-approved cost estimates reflecting the Commission-approved plan for disposal site closure and stabilization. The applicant's cost estimates must take into account total capital costs that would be incurred if an independent contractor were hired to perform the closure and stabilization work.

(b) In order to avoid unnecessary duplication and expense, the Commission will accept financial sureties that have been consolidated with earmarked financial or surety arrangements established to meet

requirements of other Federal or State agencies and/or local governing bodies for such decontamination, closure and stabilization. The Commission will accept this arrangement only if they are considered adequate to satisfy these requirements and that the portion of the surety which covers the closure of the disposal site is clearly identified and committed for use in accomplishing these activities.

(c) The licensee's surety mechanism will be annually reviewed by the Commission to assure that sufficient funds are available for completion of the closure plan, assuming that the work has to be performed by an independent contractor.

(d) The amount of surety liability should change in accordance with the predicted cost of future closure and stabilization. Factors affecting closure and stabilization cost estimates include: inflation; increases in the amount of disturbed land; changes in engineering plans; closure and stabilization that has already been accomplished and any other conditions affecting costs. This will yield a surety that is at least sufficient at all times to cover the costs of closure of the disposal units that are expected to be used before the next license renewal.

(e) The term of the surety mechanism must be open ended unless it can be demonstrated that another arrangement would provide an equivalent level of assurance. This assurance could be provided with a surety mechanism which is written for a specified period of time (e.g., five years) yet which must be automatically renewed unless the party who issues the surety notifies the Commission and the beneficiary (the site owner) and the principal (the licensee) not less than 90 days prior to the renewal date of his intention not to renew. In such a situation the licensee must submit a replacement surety within 30 days after notification of cancellation. If the licensee fails to provide a replacement surety acceptable to the Commission, the site owner may collect on the original surety.

(f) Proof of fair use must not be necessary to collect the surety so that in the event that the licensee could not provide an acceptable replacement surety within the required time, the surety shall be automatically collected prior to its expiration. The conditions described above would have to be clearly stated on any surety instrument which is not open-ended, and these are agreed to by all parties, licensee and the surety mechanism must remain in effect until the disposal and cleanup program has been completed and approved by the Commission and the

license has been transferred to the site owner.

(g) Financial surety arrangements generally acceptable to the Commission include: surety bonds, cash deposits, certificates of deposits, deposits of government securities, escrow accounts, irrevocable letters or lines of credit, trust funds, and combinations of the above or such other types of arrangements as may be approved by the Commission. However, self-insurance, or any arrangement which essentially constitutes pledging the assets of the licensee, will not satisfy the surety requirement for private sector applicants since this provides no additional assurance other than that which already exists through license requirements.

§ 61.63 Financial assurances for institutional controls.

(a) Prior to the issuance of the license, the applicant shall provide for Commission review and approval a copy of a binding arrangement, such as a lease, between the applicant and the disposal site owner that ensures that sufficient funds will be available to cover the costs of monitoring and any required maintenance during the institutional control period. The binding arrangement will be reviewed periodically by the Commission to ensure that changes in inflation, technology and disposal facility operations are reflected in the arrangement.

(b) Subsequent changes to the binding arrangement specified in paragraph (a) of this section relevant to institutional control shall be submitted to the Commission for approval.

Subpart F—Participation by State Governments and Indian Tribes

§ 61.70 Scope.

This subpart describes mechanisms through which the Commission will implement a formal request from a State or tribal government to participate in the review of a license application for a land disposal facility. Nothing in this subpart may be construed to bar the State or tribal governing body from participating in subsequent Commission proceedings concerning the license application as provided under Federal law and regulations.

§ 61.71 State and Tribal government consultation.

Upon request of a State or tribal governing body, the Director shall make available Commission staff to discuss with representatives of the State or tribal governing body information submitted by the applicant, applicable

Commission regulations, licensing procedures, potential schedules, and the type and scope of State activities in the license review permitted by law. In addition, staff shall be made available to consult and cooperate with the State or tribal governing body in developing proposals for participation in the license review.

§ 61.72 Filing of proposals for State and Tribal participation.

(a) A State or tribal governing body whose interest is affected by a near-surface disposal facility at the proposed site may submit to the Director a proposal for participation in the review of a license application. Proposals must be submitted within the following time periods:

(1) For the State in which the disposal facility will be located, or any State that is member of an interstate compact that includes the State in which the disposal facility is located, no later than 45 days following publication in the *Federal Register* of the notice of tendering of an application submitted under § 61.20.

(2) For any other State, or for a tribal governing body, no later than 120 days following publication in the *Federal Register* of the notice of tendering of an application submitted under § 61.20.

(b) Proposals for participation in the licensing process must be made in writing and must be signed by the Governor of the State or the official otherwise provided for by State or tribal law.

(c) At a minimum, proposals must contain each of the following items of information:

(1) A general description of how the State or tribe wishes to participate in the licensing process specifically identifying those issues it wishes to review.

(2) A description of material and information which the State or tribe plans to submit to the Commission for consideration in the licensing process. A tentative schedule referencing steps in the review and calendar dates for planned submittals should be included.

(3) A description of any work that the State or tribe proposes to perform for the Commission in support of the licensing process.

(4) A description of State or tribal plans to facilitate local government and citizen participation.

(5) A preliminary estimate of the types and extent of impacts which the State expects, should a disposal facility be located as proposed.

(6) If desired, any requests for educational or information services (seminars, public meetings) or other

actions from the Commission such as establishment of additional Public Document Rooms or exchange of State personnel under the Intergovernmental Personnel Act.

§ 61.73 Commission approval of proposals.

(a) Upon receipt of a proposal submitted in accordance with § 61.72, the Director shall arrange for a meeting between the representatives of the State or tribal governing body and the Commission staff to discuss the proposal and to ensure full and effective participation by the State or tribe in the Commission's license review.

(b) If requested by a State or tribal governing body, the Director may approve all or any part of a proposal if the Director determines that:

(1) The proposed activities are within the scope of Commission statutory responsibility and the type and magnitude of impacts which the State or tribe may bear are sufficient to justify their participation; and

(2) The proposed activities will contribute productively to the licensing review.

(c) The decision of the Director will be transmitted in writing to the governor or the designated official of the tribal governing body.

(d) Participation by a State or Indian tribe shall not affect their rights to participate in an adjudicatory hearing as provided by Part 2 of this chapter.

Subpart G—Records, Reports, Tests, and inspections

§ 61.80 Maintenance of records, reports, and transfers.

(a) Each licensee shall maintain any records and make any reports in connection with the licensed activities as may be required by the conditions of the license or by the rules, regulations, and orders of the Commission.

(b) Records which are required by the regulations in this part or by license conditions must be maintained for a period specified by the appropriate regulations in this chapter or by license condition. If a retention period is not otherwise specified, these records must be maintained and transferred to the officials specified in paragraph (e) of this section as a condition of license termination unless the Commission otherwise authorizes their disposition.

(c) Records which must be maintained pursuant to this part may be the original or a reproduced copy or microfilm if this reproduced copy or microfilm is capable of producing copy that is clear and legible at the end of the required retention period.

(d) If there is a conflict between the Commission's regulations in this part, license condition, or other written Commission approval or authorization pertaining to the retention period for the same type of record, the longest retention period specified takes precedence.

(e) Notwithstanding paragraphs (a) through (d) of this section, copies of records of the location and the quantity of radioactive wastes contained in the disposal site must be transferred upon license termination to the chief executive of the nearest municipality, the chief executive of the county in which the facility is located, the county zoning board or land development and planning agency, the State governor and other State, local and Federal governmental agencies as designated by the Commission at the time of license termination.

(f) Following receipt and acceptance of a shipment of radioactive waste, the licensee shall record the date of disposal of the waste, the location in the disposal site, the condition of the waste packages as received, any discrepancies between materials listed on the manifest and those received, and any evidence of leaking or damaged packages or radiation or contamination levels in excess of limits specified in Department of Transportation and Commission regulations. The licensee shall briefly describe any repackaging operations of any of the waste packages included in the shipment, plus any other information required by the Commission as a license condition.

(g) Each licensee shall comply with the safeguards reporting requirements of §§ 30.55, 40.64, 70.53 and 70.54 of this chapter if the quantities or activities of materials received or transferred exceed the limits of these sections. Inventory reports required by these sections are not required for materials after disposal.

(h) Each licensee authorized to dispose of radioactive waste received from other persons shall file a copy of its financial report or a certified financial statement annually with the Commission in order to update the information base for determining financial qualifications.

(i)(1) Each licensee authorized to dispose of waste materials received from other persons, pursuant to this part, shall submit annual reports to the appropriate Commission regional office shown in Appendix D of Part 20 of this chapter, with copies to the Director of the Office of Inspection and Enforcement and the Director of the Division of Waste Management, USNRC, Washington, D.C., 20555. Reports shall be submitted by the end of

the first calendar quarter of each year for the preceding year; (2) The reports shall include (i) specification of the quantity of each of the principal radionuclides released to unrestricted areas in liquid and in airborne effluents during the preceding year, (ii) the results of the environmental monitoring program, (iii) a summary of licensee disposal unit survey and maintenance activities, (iv) a summary, by waste class, of activities and quantities of radionuclides disposed of, (v) any instances in which observed site characteristics were significantly different from those described in the application for a license; and (vi) any other information the Commission may require. If the quantities of radioactive materials released during the reporting period, monitoring results, or maintenance performed are significantly different from those expected in the materials previously reviewed as part of the licensing action, the report must cover this specifically.

(j) Each licensee shall report in accordance with the requirements of § 70.52 of this chapter.

(k) Any transfer of byproduct, source, and special nuclear materials by the licensee is subject to the requirements in §§ 30.41, 40.51, and 70.42 of this chapter. Byproduct, source and special nuclear material means materials as defined in these parts, respectively.

§ 61.81 Tests at land disposal facilities.

(a) Each licensee shall perform, or permit the Commission to perform, any tests as the Commission deems appropriate or necessary for the administration of the regulations in this part, including tests of:

(1) Radioactive wastes and facilities used for the receipt, storage, treatment, handling and disposal of radioactive wastes.

(2) Radiation detection and monitoring instruments; and

(3) Other equipment and devices used in connection with the receipt, possession, handling, treatment, storage, or disposal of radioactive waste.

(b) [Reserved]

§ 61.82 Commission inspections of land disposal facilities.

(a) Each licensee shall afford to the Commission at all reasonable times opportunity to inspect radioactive waste not yet disposed of, and the premises, equipment, operations, and facilities in which radioactive wastes are received, possessed, handled, treated, stored, or disposed of.

(b) Each licensee shall make available to the Commission for inspection, upon

reasonable notice, records kept by it pursuant to the regulations in this chapter. Authorized representatives of the Commission may copy and take away copies of, for the Commission's use, any record required to be kept pursuant to this part.

§ 61.83 Violations.

An injunction or other court order may be obtained prohibiting any violation of any provision of the Atomic Energy Act of 1954, as amended, or any regulation or order issued thereunder. A court order may be obtained for the payment of a civil penalty imposed pursuant to section 234 of the Act for violation of section 53, 57, 62, 63, 81, 82, 101, 103, 104, 107, or 109 of the Act, or section 206 of the Energy Reorganization Act of 1974, or any rule.

The following amendments are also made to existing parts of the regulations in this chapter.

PART 2—RULES OF PRACTICE

2. In § 2.101, paragraph (a)(2), (b), and (d) are revised and a new (g) is added to read as follows:

§ 2.101 Filing of application.

(a) * * *

(2) Each application for a license for a facility or for receipt of waste radioactive material from other persons for the purpose of commercial disposal by the waste disposal licensee will be assigned a docket number. However, to allow a determination as to whether an application for a construction permit or operating license for a production or utilization facility is complete and acceptable for docketing, it will be initially treated as a tendered application after it is received and a copy of the tendered application will be available for public inspection in the Commission's Public Document Room, 1717 H Street NW., Washington, D.C. Generally, that determination will be made within a period of thirty (30) days. However, in selected construction permit applications, the Commission may decide to determine acceptability on the basis of the technical adequacy of the application as well as its completeness. In such cases, the Commission, pursuant to § 2.104(a), will direct that the notice of hearing be issued as soon as practicable after the application has been tendered, and the determination of acceptability will generally be made within a period of sixty (60) days. For docketing and other requirements for applications pursuant to Part 61 of this chapter, see paragraph (g) of this section.

* * * * *

(b) After the application has been docketed each applicant for a license for receipt of waste radioactive material from other persons for the purpose of commercial disposal by the waste disposal licensee except applicants under Part 61 of this chapter, who must comply with paragraph (g) of this section, shall serve a copy of the application and environmental report, as appropriate, on the chief executive of the municipality in which the activity is to be conducted or, if the activity is not to be conducted within a municipality on the chief executive of the county, and serve a notice of availability of the application or environmental report on the chief executives of the municipalities or counties which have been identified in the application or environmental report as the location of all or part of the alternative sites, containing the following information: Docket number of the application; a brief description of the proposed site and facility; the location of the site and facility as primarily proposed and alternatively listed; the name, address, and telephone number of the applicant's representative who may be contacted for further information; notification that a draft environmental impact statement will be issued by the Commission and will be made available upon request to the Commission; and notification that if a request is received from the appropriate chief executive, the applicant will transmit a copy of the application and environmental report, and any changes to such documents which affect the alternative site location, to the executive who makes the request. In complying with the requirements of this paragraph (b) the applicant should not make public distribution of those parts of the application subject to § 2.790(d). The applicant shall submit to the Director of Nuclear Material Safety and Safeguards an affidavit that service of the notice of availability of the application or environmental report has been completed along with a list of names and addresses of those executives upon whom the notice was served.

(d) The Director of Nuclear Reactor Regulation or Director of Nuclear Material Safety and Safeguards, as appropriate, will give notice of the docketing of the public health and safety, common defense and security, and environmental parts of an application for a license for a facility or for receipt of waste radioactive material from other persons for the purpose of commercial disposal by the waste disposal licensee, except that for applications pursuant to Part 61 of this

chapter paragraph (g) of this section applies, to the Governor or other appropriate official of the State in which the facility is to be located or the activity is to be conducted and will cause to be published in the **Federal Register** a notice of docketing of the application which states the purpose of the application and specifies the location at which the proposed activity would be conducted.

(g) Each application for a license to receive radioactive waste from other persons for disposal under Part 61 of this chapter and the accompanying environmental report shall be processed in accordance with the provisions of this paragraph.

(1) To allow a determination as to whether the application or environmental report is complete and acceptable for docketing, it will be initially treated as a tendered document, and a copy will be available for public inspection in the Commission's Public Document Room 1717 H Street NW., Washington, D.C. One original and two copies shall be filed to enable this determination to be made.

(i) Upon receipt of a tendered application, the Commission will publish in the **Federal Register** notice of the filed application and will notify the governors, legislatures and other appropriate State, county, and municipal officials and tribal governing bodies of the States and areas containing or potentially affected by the activities at the proposed site and the alternative sites. The Commission will inform these officials that the Commission staff will be available for consultation pursuant to § 61.71 of this chapter. The **Federal Register** notice will note the opportunity for interested persons to submit views and comments on the tendered application for consideration by the Commission and applicant. The Commission will also notify the U.S. Bureau of Indian Affairs when tribal governing bodies are notified.

(ii) The Commission will also post a public notice in a newspaper or newspapers of general circulation in the affected States and areas summarizing information contained in the applicant's tendered application and noting the opportunity to submit views and comments.

(iii) When the Director of Nuclear Material Safety and Safeguards determines that the tendered document is complete and acceptable for docketing, a docket number will be assigned and the applicant will be notified of the determination. If it is determined that all or any part of the

tendered document is incomplete and therefore not acceptable for processing, the applicant will be informed of this determination and the aspects in which the document is deficient.

(2) With respect to any tendered document that is acceptable for docketing, the applicant will be requested to (i) submit to the Director of Nuclear Material Safety and Safeguards such additional copies as the regulations in Parts 61 and 51 of this chapter require, (ii) serve a copy of the chief executive of the municipality in which the waste is to be disposed of or, if the waste is not to be disposed of within a municipality, serve a copy on the chief executive of the county in which the waste is to be disposed of, (iii) make direct distribution of additional copies to Federal, State, Indian Tribe, and local officials in accordance with the requirements of this chapter and written instructions from the Director of Nuclear Material Safety and Safeguards, and (iv) serve a notice of availability of the application and environmental report on the chief executives or governing bodies of the municipalities or counties which have been identified in the application and environmental report as the location of all or part of the alternative sites if copies are not distributed under paragraph (g)(2)(iii) of this section to the executives or bodies. All distributed copies shall be completely assembled documents identified by docket number. Subsequently distributed amendments, however, may include revised pages to previous submittals and, in such cases, the recipients will be responsible for inserting the revised pages. In complying with the requirements of paragraph (g) of this section the applicant shall not make public distribution of those parts of the application subject to § 2.790(d).

(3) The tendered document will be formally docketed upon receipt by the Director of Nuclear Material Safety and Safeguards of the required additional copies. Distribution of the additional copies shall be deemed to be complete as of the time the copies are deposited in the mail or with a carrier prepaid for delivery to the designated addressees. The date of docketing shall be the date when the required copies are received by the Director of Nuclear Material Safety and Safeguards. Within ten (10) days after docketing, the applicant shall submit to the Director of Nuclear Material Safety and Safeguards a written statement that distribution of the additional copies to Federal, State, Indian Tribe, and local officials has been completed in accordance with requirements of this section and written instructions furnished to the applicant

by the Director of Nuclear Material Safety and Safeguards.

(4) Amendments to the application and environmental report shall be filed and distributed and a written statement shall be furnished to the Director of Nuclear Material Safety and Safeguards in the same manner as for the initial application and environmental report.

(5) The Director of Nuclear Material Safety and Safeguards will cause to be published in the *Federal Register* a notice of docketing which identifies the State and location of the proposed waste disposal facility and will give notice of docketing to the governor of that State and other officials listed in paragraph (g)(3) of this section and, in a reasonable period thereafter, publish in the *Federal Register* a notice pursuant to § 2.105 offering opportunity to request a hearing to the applicant and other affected persons.

3. Section 2.103(a) is revised to read as follows:

§ 2.103 Action on applications for byproduct, source, special nuclear material, and operator licenses.

(a) If the Director of Nuclear Reactor Regulation or the Director of Nuclear Material Safety and Safeguards, as appropriate, finds that an application for a byproduct, source, special nuclear material, or operator license complies with the requirements of the Act, the Energy Reorganization Act, and this chapter, he will issue a license. If the license is for a facility, or for receipt of waste radioactive material from other persons for the purpose of commercial disposal by the waste disposal licensee, or if it is to receive and possess high-level radioactive waste at a geologic repository operations area pursuant to Part 60 of this chapter, the Director of Nuclear Reactor Regulation or the Director of Nuclear Material Safety and Safeguards, as appropriate, will inform the State, tribal and local officials specified in § 2.104(e) of the issuance of the license. For notice of issuance requirements for licenses issued pursuant to Part 61 of this chapter, see § 2.106(d) of this part.

4. Section 2.104(e) is revised to read as follows:

§ 2.104 Notice of hearing.

(e) The Secretary will give timely notice of the hearing to all parties and to other persons, if any, entitled by law to notice. The Secretary will transmit a notice of hearing on an application for a facility license or for a license for receipt of waste radioactive material from other persons for the purpose of

commercial disposal by the waste disposal licensee and all applications for disposal under Part 61 of this chapter or for a license to receive and possess high-level radioactive waste at a geologic repository operations area pursuant to Part 60 of this chapter to the governor or other appropriate official of the State and to the chief executive of the municipality in which the facility is to be located or the activity is to be conducted or, if the facility is not to be located or the activity conducted within a municipality, to the chief executive of the county (or to the Tribal organization, if it is to be so located or conducted within an Indian reservation).

5. Section 2.105(a)(2) is revised to read as follows:

§ 2.105 Notice of proposed action.

(a) * * *

(2) A license for receipt of waste radioactive material from other persons for the purpose of commercial disposal by the waste disposal licensee. All licenses issued under Part 61 of this chapter shall be so noticed.

6. Section 2.106 is amended by adding a new paragraph (d) to read as follows:

§ 2.106 Notice of issuance.

(d) The Director of Nuclear Material Safety and Safeguards will also cause to be published in the *Federal Register* notice of, and will inform the State and local officials or tribal governing body specified in § 2.104(e) of any licensing action with respect to a license to receive radioactive waste from other persons for disposal under Part 61 of this chapter or the amendment of such a license for which a notice of proposed action has been previously published.

7. A new Section 2.765 is added to read as follows:

§ 2.765 Immediate effectiveness of initial decision directing issuance or amendment of licenses under Part 61 of this chapter.

An initial decision directing the issuance of a license under Part 61 of this chapter (relating to land disposal of radioactive waste) or any amendment to such a license authorizing actions which may significantly affect the health and safety of the public, will become effective only upon order of the Commission. The Director of Nuclear Material Safety and Safeguards may not issue a license under Part 61 of this chapter, or any amendment to such a license which may significantly affect the health and safety of the public, until expressly authorized to do so by the Commission.

PART 19—NOTICES, INSTRUCTIONS AND REPORTS TO WORKERS; INSPECTIONS**§ 19.2 [Amended]**

8. Section 19.2 is amended by adding "61." following "40, 60."

§ 19.3 [Amended]

9. In § 19.3, paragraph (d) is amended by adding "61." following "40, 60."

PART 20—STANDARDS FOR PROTECTION AGAINST RADIATION**§ 20.2 [Amended]**

10. Section 20.2 is amended by adding "61." following "40, 60."

§ 20.3 [Amended]

11. In § 20.3, paragraph (a)(9) is amended by adding "61." following "40, 60."

12. In § 20.301 paragraph (a) is amended by adding "61." following "40, 60." and paragraph (b) is revised to read as follows:

§ 20.301 General requirement.

(b) As authorized under § 20.302 or Part 61 of this chapter; or

§ 20.302 [Amended]

13. In § 20.302, paragraph (b) is removed and paragraph (c) is redesignated as paragraph (b).

14. A new § 20.311 is added to read as follows:

§ 20.311 Transfer for disposal and manifests.

(a) Purpose. The requirements of this section are designed to control transfers of radioactive waste intended for disposal at a land disposal facility and establish a manifest tracking system and supplement existing requirements concerning transfers and recordkeeping for such wastes. The reporting and recordkeeping requirements contained in this section have been approved by the Office of Management and Budget; OMB approval No. 3150-0014.

(b) Each shipment of radioactive waste to a licensed land disposal facility must be accompanied by a shipment manifest that contains the name, address, and telephone number of the person generating the waste. The manifest shall also include the name, address, and telephone number or the name and EPA hazardous waste identification number of the person transporting the waste to the land disposal facility. The manifest must also indicate as completely as practicable: a physical description of the waste; the volume; radionuclide identity and

quantity; the total radioactivity; and the principal chemical form. The solidification agent must be specified. Waste containing more than 0.1% chelating agents by weight must be identified and the weight percentage of the chelating agent estimated. Wastes classified as Class A, Class B, or Class C in § 61.55 of this chapter must be clearly identified as such in the manifest. The total quantity of the radionuclides H-3, C-14, Tc-99 and I-129 must be shown. The manifest required by this paragraph may be shipping papers used to meet Department of Transportation or Environmental Protection Agency regulations or requirements of the receiver, provided all the required information is included. Copies of manifests required by this section may be legible carbon copies or legible photocopies.

(c) Each manifest must include a certification by the waste generator that the transported materials are properly classified, described, packaged, marked, and labeled and are in proper condition for transportation according to the applicable regulations of the Department of Transportation and the Commission. An authorized representative of the waste generator shall sign and date the manifest.

(d) Any generating licensee who transfers radioactive waste to a land disposal facility or a licensed waste collector shall comply with the requirements in paragraphs (d)(1) through (8) of this section. Any generating licensee who transfers waste to a licensed waste processor who treats or repackages waste shall comply with the requirements of paragraphs (d)(4) through (8) of this section. A licensee shall:

(1) Prepare all wastes so that the waste is classified according to § 61.55 and meets the waste characteristics requirements in § 61.56 of this chapter;

(2) Label each package of waste to identify whether it is Class A waste, Class B waste, or Class C waste, in accordance with § 61.55 of this chapter;

(3) Conduct a quality control program to assure compliance with §§ 61.55 and 61.56 of this chapter; the program must include management evaluation of audits;

(4) Prepare shipping manifests to meet the requirements of §§ 20.311 (b) and (c) of this part;

(5) Forward a copy of the manifest to the intended recipient, at the time of shipment; or, deliver to a collector at the time the waste is collected, obtaining acknowledgement of receipt in the form of a signed copy of the manifest or

equivalent documentation from the collector;

(6) Include one copy of the manifest with the shipment;

(7) Retain a copy of the manifest and documentation of acknowledgement of receipt as the record of transfer of licensed material as required by Parts 30, 40, and 70 of this chapter; and,

(8) For any shipments or any part of a shipment for which acknowledgement of receipt has not been received within the times set forth in this section, conduct an investigation in accordance with paragraph (h) of this section.

(e) Any waste collector licensee who handles only prepackaged waste shall:

(1) Acknowledge receipt of the waste from the generator within one week of receipt by returning a signed copy of the manifest or equivalent documentation;

(2) Prepare a new manifest to reflect consolidated shipments; the new manifest shall serve as a listing or index for the detailed generator manifests. Copies of the generator manifests shall be a part of the new manifest. The waste collector may prepare a new manifest without attaching the generator manifests, provided the new manifest contains for each package the information specified in paragraph (b) of this section. The collector licensee shall certify that nothing has been done to the waste which would invalidate the generator's certification;

(3) Forward a copy of the new manifest to the land disposal facility operator at the time of shipment;

(4) Include the new manifest with the shipment to the disposal site;

(5) Retain a copy of the manifest and documentation of acknowledgement of receipt as the record of transfer of licensed material as required by Parts 30, 40, and 70 of this chapter, and retain information from generator manifests until disposition is authorized by the Commission; and,

(6) For any shipments or any part of a shipment for which acknowledgement of receipt is not received within the times set forth in this section, conduct an investigation in accordance with paragraph (h) of this section.

(f) Any licensed waste processor who treats or repackages wastes shall:

(1) Acknowledge receipt of the waste from the generator within one week of receipt by returning a signed copy of the manifest or equivalent documentation;

(2) Prepare a new manifest that meets the requirements of paragraphs (b) and (c) of this section. Preparation of the new manifest reflects that the processor is responsible for the waste;

(3) Prepare all wastes so that the waste is classified according to § 61.55

and meets the waste characteristics requirements in § 61.56 of this chapter;

(4) Label each package of waste to identify whether it is Class A waste, Class B waste, or Class C waste, in accordance with §§ 61.55 and 61.57 of this chapter;

(5) Conduct a quality control program to assure compliance with §§ 61.55 and 61.56 of this chapter. The program shall include management evaluation of audits;

(6) Forward a copy of the new manifest to the disposal site operator or waste collector at the time of shipment, or deliver to a collector at the time the waste is collected, obtaining acknowledgement of receipt in the form of a signed copy of the manifest or equivalent documentation by the collector;

(7) Include the new manifest with the shipment;

(8) Retain copies of original manifests and new manifests and documentation of acknowledgement of receipt as the record of transfer of licensed material required by Parts 30, 40, and 70 of this chapter; and

(9) For any shipment or part of a shipment for which acknowledgement is not received within the times set forth in this section, conduct an investigation in accordance with paragraph (h) of this section.

(g) The land disposal facility operator shall:

(1) Acknowledge receipt of the waste within one week of receipt by returning a signed copy of the manifest or equivalent documentation to the shipper. The shipper to be notified is the licensee who last possessed the waste and transferred the waste to the operator. The returned copy of the manifest or equivalent documentation shall indicate any discrepancies between materials listed on the manifest and materials received;

(2) Maintain copies of all completed manifests or equivalent documentation until the Commission authorizes their disposition; and

(3) Notify the shipper (i.e., the generator, the collector, or processor) and the Director of the nearest Commission Regional Office listed in Appendix D of this part when any shipment or part of a shipment has not arrived within 60 days after the advance manifest was received.

(h) Any shipment or part of a shipment for which acknowledgement is not received within the times set forth in this section, must:

(1) Be investigated by the shipper if the shipper has not received notification of receipt within 20 days after transfer; and

(2) Be traced and reported. The investigation shall include tracing the shipment and filing a report with the nearest Commission Regional Office listed in Appendix D of this part. Each licensee who conducts a trace investigation shall file a written report with the nearest Commission's Regional office within 2 weeks of completion of the investigation.

15. In § 20.401, paragraphs (b) and (c)(3) are revised to read as follows:

§ 20.401 Records of surveys, radiation monitoring, and disposal.

(b) Each licensee shall maintain records in the same units used in this part showing the results of surveys required by § 20.201(b), monitoring required by §§ 20.205(b) and 20.205(c), and disposals made under §§ 20.302, 20.303, removed § 20.304,¹ and Part 61 of this chapter.

(c) * * *

(3) Records of disposal of licensed materials made pursuant to §§ 20.302, 20.303, removed § 20.304,¹ and Part 61 of this chapter are to be maintained until the Commission authorizes their disposition.

* * *

16. Section 20.408 is amended by adding a new paragraph (a)(7) to read as follows:

§ 20.408 Reports of personnel monitoring on termination of employment or work.

(a) * * *

(7) Receive radioactive waste from other persons for disposal under Part 61 of this chapter.

* * *

PART 21—REPORTING OF DEFECTS AND NONCOMPLIANCE

§ 21.2 [Amended]

17. Section 21.2 is amended by inserting "61," after "40, 60," in both the first and second sentences.

§ 21.3 [Amended]

18. In § 21.3, paragraphs (a)(2), (a-1)(1), (a-1)(2), and (k) are amended by adding "61," after "50, 60."

§ 21.21 [Amended]

19. Section 21.21 is amended by adding "61," after "50, 60," in paragraphs (b)(1)(i) and (b)(1)(ii).

¹ Section 20.304 provided for burial of small quantities of licensed materials in soil. Notice of its removal appears in the *Federal Register* of October 30, 1980 (45 FR 71762).

PART 30—RULES OF GENERAL APPLICABILITY TO DOMESTIC LICENSING OF BYPRODUCT MATERIAL

20. A new paragraph (d) is added to § 30.11 to read as follows:

§ 30.11 Specific exemptions.

* * *

(d) Except as specifically provided in Part 61 of this chapter, any licensee is exempt from the requirements of this part to the extent that its activities are subject to the requirements of Part 61 of this chapter.

21. In § 30.32, paragraph (f) is amended to read as follows:

§ 30.32 Application for specific licenses.

* * *

(f) An application for a license to receive and possess byproduct material for the conduct of any activity which the Commission determines will significantly affect the quality of the environment shall be filed at least 9 months prior to commencement of construction of the plant or facility in which the activity will be conducted and shall be accompanied by any Environmental Report required pursuant to Part 51 of this chapter.

22. In § 30.33, paragraph (a)(5) is revised to read as follows:

§ 30.33 General requirements for issuance of specific licenses.

(a) * * *

(5) In the case of an application for a license to receive and possess byproduct material for the conduct of any activity which the Commission determines will significantly affect the quality of the environment, the Director of Nuclear Material Safety and Safeguards or his designee, before commencement of construction of the plant or facility in which the activity will be conducted, on the basis of information filed and evaluations made pursuant to Part 51 of this chapter, has concluded, after weighing the environmental, economic, technical, and other benefits against environmental costs and considering available alternatives, that the action called for is the issuance of the proposed license, with any appropriate conditions to protect environmental values. Commencement of construction prior to such conclusion shall be grounds for denial of a license to receive and possess byproduct material in such plant or facility. As used in this paragraph the term "commencement of construction" means any clearing of land, excavation, or other substantial action that would adversely affect the

environment of a site. The term does not mean site exploration, necessary roads for site exploration, borings to determine foundation conditions, or other preconstruction monitoring or testing to establish background information related to the suitability of the site or the protection of environmental values.

PART 40—DOMESTIC LICENSING OF SOURCE MATERIAL

23. In § 40.14, a new paragraph (d) is added to read as follows:

§ 40.14 Specific exemptions.

(d) Except as specifically provided in Part 61 of this chapter any licensee is exempt from the requirements of this part to the extent that its activities are subject to the requirements of Part 61 of this chapter.

24. In § 40.31, paragraph (f) is revised to read as follows:

§ 40.31 Applications for specific licenses.

(f) An application for a license to possess and use source material for uranium milling, production of uranium hexafluoride, or for the conduct of any other activity which the Commission determines will significantly affect the quality of the environment shall be filed at least 9 months prior to commencement of construction of the plant or facility in which the activity will be conducted and shall be accompanied by any Environmental Report required pursuant to Part 51 of this chapter.

25. In § 40.32, paragraph (e) is revised to read as follows:

§ 40.32 General requirements for issuance of specific licenses.

(e) In the case of an application for a license to possess and use source and byproduct material for uranium milling, production of uranium hexafluoride, or for the conduct of any other activity which the Commission determines will significantly affect the quality of the environment, the Director of Nuclear Material Safety and Safeguards or his designee, before commencement of construction of the plant or facility in which the activity will be conducted, on the basis of information filed and evaluations made pursuant to Part 51 of this chapter, has concluded, after weighing the environmental, economic, technical and other benefits against environmental costs and considering available alternatives, that the action

called for is the issuance of the proposed license, with any appropriate conditions to protect environmental values. Commencement of construction prior to such a conclusion shall be grounds for denial of a license to possess and use source and byproduct material in such plant or facility. As used in this paragraph the term "commencement of construction" means any clearing of land, excavation, or other substantial action that would adversely affect the environment of a site. The term does not mean site exploration, necessary roads for site exploration, borings to determine foundation conditions, or other preconstruction monitoring or testing to establish background information related to the suitability of the site or the protection of environmental values.

PART 51—LICENSING AND REGULATORY POLICY AND PROCEDURES FOR ENVIRONMENTAL PROTECTION

26. In § 51.5, paragraphs (a)(6) and (b)(4)(iii) are revised, paragraph (b)(6) is amended by inserting "61" following "50, 60.", and (d)(3) is amended by inserting "61" following "50, 60." The revised paragraphs read as follows:

§ 51.5 Actions requiring preparation of environmental impact statements, negative declarations, environmental impact appraisals; actions excluded.

- (a) * * *
- (6) Issuance of a license authorizing receipt and disposal of radioactive waste from other persons under Part 61 of this chapter;
- (b) * * *
- (4) * * *
- (iii) Authorizing receipt and disposal of radioactive waste from other persons under Part 61 of this chapter.

§ 51.40 [Amended]

27. In § 51.40, paragraph (c) is amended by inserting "61" after "30, 40."

PART 70—DOMESTIC LICENSING OF SPECIAL NUCLEAR MATERIAL

28. In § 70.14, a new paragraph (d) is added to read as follows:

§ 70.14 Specific exemptions.

(d) Except as specifically provided in Part 61 of this chapter, any licensee is exempt from the requirements of the regulations in this part to the extent that its activities are subject to the requirements of Part 61 of this chapter.

29. In § 70.21, paragraph (f) is revised to read as follows:

§ 70.21 Filing.

(f) An application for a license to possess and use special nuclear material for processing and fuel fabrication, scrap recovery or conversion of uranium hexafluoride, or for the conduct of any other activity which the Commission determines will significantly affect the quality of the environment shall be filed at least 9 months prior to commencement of construction of the plant or facility in which the activity will be conducted, and shall be accompanied by an Environmental Report required under Part 51 of this chapter.

30. In § 70.23, paragraph (a)(7) is revised to read as follows:

§ 70.23 Requirements for the approval of applications.

- (a) * * *
- (7) Where the proposed activity is processing and fuel fabrication, scrap recovery, conversion of uranium hexafluoride, or any other activity which the Commission determines will significantly affect the quality of the environment, the Director of Nuclear Material Safety and Safeguards or his designee, before commencement of construction of the plant or facility in which the activity will be conducted, on the basis of information filed and evaluations made pursuant to Part 51 of this chapter, has concluded, after weighing the environmental, economic, technical, and other benefits against environmental costs and considering available alternatives, that the action called for is the issuance of the proposed license, with any appropriate conditions to protect environmental values. Commencement of construction prior to such conclusions shall be grounds for denial to possess and use special nuclear material in such plant or facility. As used in this paragraph the term "commencement of construction" means any clearing of land, excavation, or other substantial action that would adversely affect the environment of a site. The term does not mean site exploration, necessary roads for site exploration, borings to determine foundation conditions, or other preconstruction monitoring or testing to establish background information related to the suitability of the site or the protection of environmental values.

PART 73—PHYSICAL PROTECTION OF PLANTS AND MATERIALS

31. In § 73.1, paragraph (b)(1)(iii) is revised to read as follows:

§ 73.1 Purpose and scope.

(b) * * *

(1) * * *

(iii) the physical protection of special nuclear material by any person who, pursuant to the regulations in Part 61 or 70 of this chapter, possesses or uses at any site or contiguous sites subject to the control by the licensee, formula quantities of strategic special nuclear material or special nuclear material of moderate strategic significance or special nuclear material of low strategic significance.

PART 170—FEES FOR FACILITIES AND MATERIALS LICENSES AND OTHER REGULATORY SERVICES UNDER THE ATOMIC ENERGY ACT OF 1954; AS AMENDED

32. Section 170.2 is revised to read as follows:

§ 170.2 Scope.

Except for persons who apply for or hold the permits, licenses, or approvals exempted in § 170.11, the regulations in this part apply to a person who is an applicant for, or holder of, a specific byproduct material license issued pursuant to Parts 30 and 32-35 of this chapter, a specific source material license issued pursuant to Part 40 of this chapter, a specific materials license issued under Part 61 of this chapter, a specific special nuclear material license issued pursuant to Part 70 of this chapter, a specific license for the storage of spent fuel issued pursuant to Part 72 of this Chapter, a specific approval of spent fuel casks and shipping containers issued pursuant to Part 71 of this chapter, a specific request for approval of sealed sources and devices containing byproduct material, source material, or special nuclear material, or a production or utilization facility construction permit and operating license issued pursuant to Part 50 of this chapter, to routine safety and safeguards inspections of a licensed person, to a person who applies for approval of a reference standardized design of a nuclear steam supply system or balance of plant, for review of a facility site prior to the submission of an application for a construction permit, for review of an independent spent fuel storage installation pursuant to Part 72 of this chapter, and for a special project review which the Commission

completes or makes whether or not in conjunction with a license application on file or which may be filed.

[Amendments to all parts are issued pursuant to citations of authority presently codified or, in the case of 10 CFR Part 61, as set out after the list of sections in the new Part 61.]

Dated at Washington, D.C. this 9th day of December, 1982.

For the U.S. Nuclear Regulatory Commission.

Samuel J. Chilk.

Secretary of the Commission.

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